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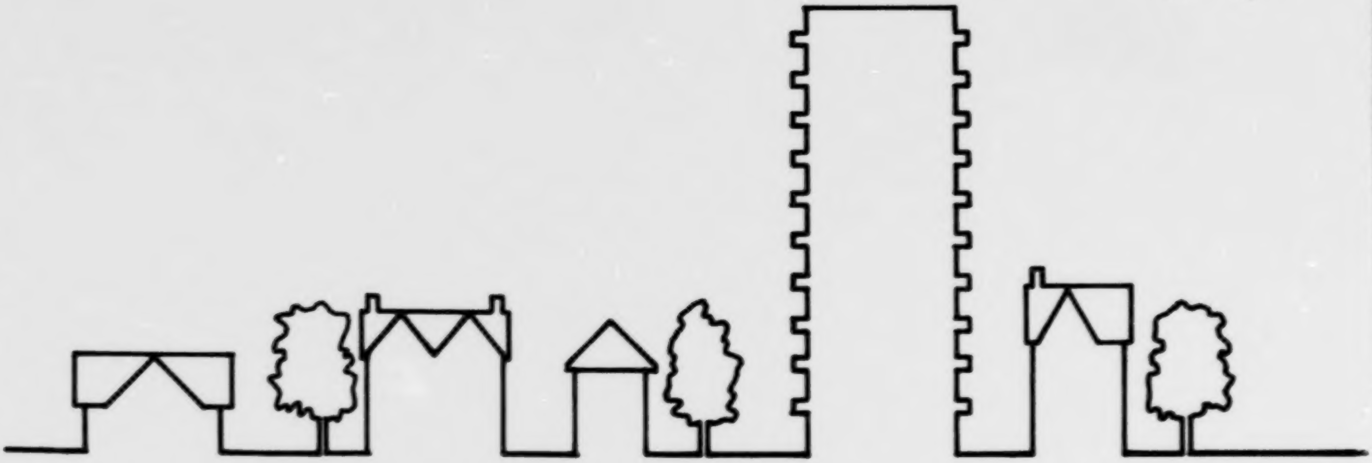

# STUDY OF RESIDENTIAL INTENSIFICATION AND RENTAL HOUSING CONSERVATION

## PART 4 : CONSERVING THE EXISTING RENTAL HOUSING STOCK

## 4.1 : RECENT RENTAL STOCK LOSSES AND THE IMPACT OF DECONVERSION

PREPARED FOR
THE ONTARIO MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING
AND THE ASSOCIATION OF MUNICIPALITIES OF ONTARIO

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MARCH 1983

## VOLUME 9

NOTE:

This is a consultants' report. Any statements or opinions expressed herein are those of the writers or of persons quoted and, unless otherwise noted, are not necessarily endorsed by the Ministry of Municipal Affairs & Housing, Government of Ontario, or the Association of Municipalities of Ontario.

# FOREWORD

This study was commissioned jointly by the Ontario Ministry of Municipal Affairs and Housing and the Association of Municipalities of Ontario. Funding for the study was provided by the Ontario Ministry of Municipal Affairs and Housing through the Housing Renovation and Energy Conservation Unit of the Community Housing Wing. The Ministry's chief representative on the study was Mr. George Przybylowski of the Housing Renovation and Energy Conservation Unit. In this capacity, Mr. Przybylowski was the prime client contact throughout the study process and the consultants wish to express their gratitude to him for his considerable personal committment to this study and the many creative and useful suggestions he made during the course of the investigations.

The findings, conclusions and recommendations contained in the various volumes of the study report are those of the consultants as are any factual errors they may contain. The report does not constitute Ontario Government or A.M.O. policy but is a report to these two organizations for their consideration.

Peter G. McInnis
Study Director

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## GENERAL INTRODUCTION

This document forms one volume of an eleven volume study report commissioned jointly by the Ontario Ministry of Municipal Affairs and Housing and the Association of Municipalities of Ontario (A.M.O.) in July, 1982. The prime objectives of the study were:

1. To examine the opportunities and constraints that exist for meeting some of the future additional housing needs in Ontario during the 1980's and 1990's through the intensification of existing residential neighbourhoods.
2. To examine some of the major forces at work that have and could threaten the conservation of the existing stock of rental housing and the tenants that occupy this stock.

These objectives were formulated in response to concerns on the part of the Ministry and A.M.O. regarding recent and emerging trends in housing and urban development and population growth and change in Ontario.

It is safe to assume that there will continue to be a demand for more rental and ownership housing units in Ontario during the 1980's and 1990's due to both an absolute increase in population and an increase in the number of households. However, there is growing evidence that this demand could be different in nature than during the last decade. While demand will continue to be focused in urban areas, there will likely be increasing pressure for inner city housing particularly in the larger urban centres such as Toronto, Ottawa and Hamilton. Also, households are getting smaller and older; and more people are beginning to accept the prospect of never being able to afford to own a home. These trends suggest that there will be an increasing demand for smaller dwellings. While consumer preference information may not support this, the general state of the economy and the future affordability of housing may dictate these demands.

The Government of Ontario and the Association of Municipalities of Ontario are concerned about how these additional and somewhat different housing needs of the 80's and 90's will be met, particularly in light of the downturn in the construction of new private rental housing; the economic prospects for the 80's and 90's and the likely restraints on public expenditures related to new facilities and services and socially assisted housing; and the increasing difficulty of providing new housing through large scale redevelopment and/or a further expansion outwards of Ontario's urban fabric.

There are two major approaches to creating additional housing: 1) building new and 2) making more efficient (intensive) use of the housing stock that currently exists. This study is aimed primarily at the latter and specifically at the potential for meeting some of the future housing needs in the Province through the conversion of the existing stock of some 1,200,000 grade-related owner occupied dwellings in the Province. The extent to which this study is concerned with new housing was limited to the opportunities that might exist for small scale residential infill in residential neighbourhoods.

In addition to being concerned about meeting additional housing needs, the Ministry and A.M.O. were concerned about conserving the existing rental stock in a safe and livable condition for at least the same number of households as it currently accommodates. While this aging/conservation issue is by no means a new one, the nature of the issue will likely be quite different in the future. Until the late 1950's, the vast majority of housing in the Province was grade-related and owner occupied, and the conservation of these types of dwellings usually happened as a matter of course without much concern or assistance on the part of governments. In the last 30 years, however, the housing stock profile has changed dramatically with the advent of the high-rise apartment building. Rental apartments in multiple unit buildings form a much larger proportion of the stock than ever before. Approximately two-thirds of the over one million rental housing units in Ontario are located in high-rise or low-rise/walk-up multiple unit apartment buildings. Forty percent or 434,000 of the total rental units are in high-rise buildings. The conservation of the apartment rental stock has never been a serious issue in the past because of the relative newness of this stock. However, as these buildings age during the 80's and 90's (many are already 20 years old), serious attention will have to be given to the efforts that will be required to maintain these units in a safe and livable condition and within the economic reach of a large majority of the population. Therefore, the second objective of this study was in part, to examine the type of building repairs and improvements (and their associated costs) that will be required to conserve the Province's stock of some 434,000 high-rise rental apartments over the next 20 years.

A second rental housing conservation concern of the Ministry and A.M.O. had to do with the perceived loss of low-income rental accommodation that has traditionally been available in the form of rooms and apartments in grade-related dwellings in older neighbourhoods. Specifically, the study was to examine the extent of the loss of this type of housing due to demolition and deconversion resulting from the gentrification of these dwellings and the impact these losses have had on tenants.

The investigations were carried out by a series of five individual consultants working under the direction of a sixth consultant retained to coordinate and direct the study investigations. The work of each consultant was monitored and reviewed by a core study group made up of the five consultants, the study director and representatives of MOMAH and AMO.

## Core Study Group

Study Director: Peter McInnis
Klein & Sears Research and Planning Limited

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Jack Klein
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Frank Lewinberg
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Peter Milligan
Walker, Poole, Milligan

Ministry Representatives
Sue Corke
Gary McAllister
George Przybylowski

A.M.O. Representatives: Mayor W. McLean Town of Ajax

Gwyn Simmons City of Ottawa Non-Profit Housing Corporation

Special Assistant To Core Group: Betty Kaser

While the consultants' work on this study began formally at the beginning of July, 1982, some considerable effort was spent in advance of this start-up by a steering committee of Ministry and AMO representatives in developing terms of reference and a work plan with the Study Director that reflected the findings of an extensive and detailed review of the literature pertaining to the issues in question. This literature review was carried out by David Hulchanski for the Ministry during April and May of 1982 and has been published under separate cover. The prime purpose of this review was to identify the extent to which the issues in question had already been considered and the findings and conclusions that had been reached in order that the consultants' work could be focussed on those issues about which there is limited knowledge or understanding. Also, this review provided a valuable basis for establishing certain propositions to be tested in the study.

The investigations, particularly those relating to Objective #1, were carried out on a case study area basis in the municipalities of Toronto, North York, Hamilton, Kingston, Woodstock and Ottawa with special input from municipal officials in Thunder Bay. These municipalities were selected to reflect the fact that many of the issues under investigation were more associated with larger urban areas as well as to provide, at the same time, a range of sizes of municipalities for comparative purposes.

The overall study report is organized into 11 separate volumns. These 11 volumes follow the 5 part organization of the findings, conclusions and recommendations of the study investigations as indicated below:

| PART # | TITLE (Prime Consultants) | VOLUME # |
|---|---|---|
| 1 | Summary of Findings And Recommendations<br>(Klein & Sears) | 1 |
| 2 | Economic And Demographic Trends for the 80's and 90's<br>(Clayton Research Associates) | 2 |
| 3 | Residential Intensification And Future Housing Needs | |
| | 3.1 Physical Potential<br>(Clayton Research Associates) | 3 |
| | 3.2 Economic Issues<br>(Klein & Sears and Clayton Research Associates) | 4 |
| | 3.3 The Supply Process<br>(Environics Research Group and Clayton Research Associates) | 5 |
| | 3.4 Tenant Demand<br>(Environics Research Group) | 6 |
| | 3.5 Neighbourhood Impact And Resistance<br>(Environics Research Group and Lewinberg Consultants) | 7 |
| | 3.6 Municipal And Provincial Policies And Regulations<br>(Walker, Poole, Milligan) | 8 |
| 4 | Conserving The Existing Rental Housing Stock | |
| | 4.1 Recent Rental Stock Losses and the Impact of Deconversion<br>(Clayton Research Associates and Lewinberg Consultants) | 9 |

4.2 Future Conservation Requirements And Costs for High-Rise Apartments and the Possible Impact on Rents and Tenants (Klein & Sears and Clayton Research Associates) 10

5 Data Sources And Problems (Clayton Research Associates) 11

This particular volume (Volume #9) of the study report was prepared by two different consultants. Mr. Greg Lampert of Clayton Research Associates was responsible for the first part of this volume dealing with recent rental stock losses and Mr. Frank Lewinberg of Lewinberg Consultants prepared the second part of this volume dealing with the impact of deconversion.

## INTRODUCTION TO PART 4

This part of the study is devoted to the second objective of the study outlined in the General Introduction:

> "To examine some of the major forces at work that have and could threaten the conservation of the existing rental housing and the tenants that occupy this stock"

This objective is admittedly broad in scope and complex in terms of the variety of issues that it covers. Therefore, the study was directed to focus on two specific aspects of conservation:

- recent rental stock losses and the impact of deconversion activities; and
- future conservation requirements and costs for high-rise apartments and the possible impact on rents and tenants.

The results of these two areas of investigation are not closely interrelated in the same way as were the various investigations that comprise Part 3 dealing with intensification. Nonetheless, they are conceptually linked in that both deal with the very critical issue of ensuring that rental housing needs of the 80's and 90's can be met.

The existing rental stock in Ontario (as with the total housing stock) is an important and extremely valuable asset which is performing an essential function - housing people who, through necessity or choice, have opted to live in rental accommodation rather than purchase a home of their own. The current rental stock, plus additional new rental dwellings, will be required at least to the end of this century (and likely well beyond also) to accommodate projected household growth as well as current renters. Inevitably, some of this stock will be lost through various means; but each unit lost must be replaced and these replacement units, as well as the new units which are required to accommodate renter household growth, will cost 2 to 3 times as much to build as the units lost to the stock. These higher costs will, of course, be reflected in substantially higher rents for the new accommodation - rents which many of the displaced tenants simply will not be able to afford. This, plus the inefficiency of allowing an essential low-cost capital asset to degenerate or to be demolished and replaced with a high-cost capital asset, is the reason behind this study's mandate to explore ways of promoting the conservation of the existing rental stock.

The reasons behind the loss of rental stock are complex and numerous and they vary in importance from centre to centre:

- Some buildings simply are obsolete and do not provide the standard of accommodation which society dictates as being appropriate.

- Some units are located in structures which have in the past been converted to multiple occupant use which may no longer be considered to be suitable by the current owners.

- Some rental units are individually owned units (grade-related dwellings or condominiums) which can revert back and forth between rental and owner-occupation upon sale or the changing circumstances of the owner. Of particular importance is the impact of what is commonly known as "gentrification" or the deconversion and renovation of existing low rental grade-related accommodation in inner city neighbourhoods.

- In many cases, however, rental units are being lost because the current economics of the rental market are such that many private landlords can make greater returns by disposing of the properties through sale, conversion to condominium or demolition and replacement with new buildings and investing their money elsewhere.

The economics of the rental market are such that prevailing market rents are well below the rents which would be necessary to carry today's construction and financing costs for a new rental property - unless the government is prepared to contribute a significant subsidy. As was outlined in the section on the economic and demographic environment, the reasons behind the problems in the rental market are fairly straightforward - even if the solutions to the problems are difficult:

- Rent review: clearly, the imposition of rent review in 1975, at a time when rental markets were tight and rents were rising, has served to keep market rents below what would have been the case in their absence. It is tempting for many observers to blame the entire rental market imbalance on rent review but this is not the case, other factors have contributed as well.

- Lower subsidies to rental investors: in an effort to spur rental construction in the late 1970's and early 1980's, the federal and provincial governments initiated subsidy programs for investors in rental accommodation. These subsidies were very costly but they resulted in large numbers of new rental projects which had rents well below what would have been possible in the absence of the subsidies. An important impact of these programs from the point of view of the rental market as a whole was that they relieved the pressure for a strong upward movement in rents that would have occurred if the market had been left alone. Most rental subsidy programs have now been discontinued so new rental projects require markedly higher rents than those built even 2-3 years ago with the subsidies.

- High mortgage interest rates: the combination of decreased rental subsidies and the explosion in interest rates in 1979-1982 have dramatically increased the rents which would be necessary to cover costs on a new building or a building facing renewal of its mortgage.

As a result of this combination of factors, new rental units are coming onto the market at significantly higher rents than the units in existing rental projects. New production is weakened because the demand for new units is constrained by the substantial gap between the rents on these new units versus the prevailing rents in the existing stock. Landlords in the existing stock, meanwhile, have had their profits constrained below what they would be in a free market. This can result in either acceptance of the status quo (6% annual rent increases, or more if they can prove that their costs increase by more) or some action which might increase their profits. This latter course could mean one of the following:

- Sale to another landlord can increase profits since, by the rules of the rent review process, the purchaser can pass through an increase in rents as a result of increased financing costs. The ability of the new landlord to pass the higher rents on to the tenant is the key behind this process since the higher rent stream will increase the value of the property - the existing landlord could not pass on such higher financing costs.

- Conversion of multiple unit rental properties to condominium tenure can bring vastly increased values for existing rental properties since the sale prices are more closely related to dwelling replacement costs than are market rents. This avenue has been closed in most municipalities through regulations which place limitations on the ability of owners to convert existing rental properties to condominiums because of the tight rental markets.

- Postponement of normal maintenance or conservation expenses (and minimization of other expenses) can result in higher returns. Landlords can increase rents beyond 6% if they can justify the increase because of increased costs - but increased profits cannot form part of the justification and the procedure is tedious and uncertain. If cost increases can be held below 6 percent, profits will increase - profit-maximizing landlords will, therefore, have good reasons to try to minimize outlays of all kinds. There is a real danger that essential maintenance and conservation expenses on rental buildings are being postponed because of this.

- Demolition and sale or redevelopment can make economic sense in some cases as well. If a rental building is old and substantially depreciated (for tax purposes), and is in a location where a newer residential or commercial building could be successfully marketed at substantially higher rents, it may be worthwhile to demolish the existing building and replace it - even if it is of reasonably good standard. Tax rules can further this process because if a property is substantially depreciated (for tax purposes), sale of the property at a higher price could face the landlord with recaptured depreciation on the building which is taxed at twice the level of capital gains tax on the increased land value. If the building is demolished and replaced, all increased value accrues to the land and the landlord would face no recapture of depreciation. Also, if the new building is in a good location, which much of Ontario's older rental stock is, the site could probably support a quality rental or condominium building with no control on returns.

There are, real concerns that, at a time of tight rental markets in most Ontario centres, much of the existing stock of rental units is at risk because of the types of factors outlined above. Owners of rent controlled units are frustrated because their profits are being suppressed with no real prospect of significant change. Prospective investors in both new and existing rental accommodation are investing elsewhere because immediate returns are better and there are no artifical constraints on future returns. Tenants are frightened because it is difficult to find alternative accommodation at rents they feel they can afford. There is evidence of some deterioration in the upkeep of existing rental properties which, in addition to detracting from their attractiveness and utility as places to live, may be shortening their effective life.

Conserving the existing rental stock is an important issue today. We simply cannot afford to lose the current stock of rental housing when it is clear that both this stock and even more will be required at least to the end of this century. This section attempts to address this issue by examining the extent of rental stock loss in recent years and the social impact of this loss. Also, it examines the costs which we as Ontarians must face to conserve the 434,000 high-rise rental apartment units in the Province over the next 20 years, the types of options open to landlords of today's stock in meeting these costs and the likely impact on tenants of future conservation costs of high-rise rental properties.

# PART 4.1.1

# RECENT RENTAL STOCK LOSSES

Prepared by:
Clayton Research Associates

## PART 4.1.1 RECENT RENTAL STOCK LOSSES

### 1.0 INTRODUCTION

As with most parts of the study, data presented a real problem in analyzing rental stock losses. The only source of reliable information on stock losses was the case study area municipalities own files which yielded information on demolitions and condominium conversions. Also, the development of the Housing Occupancy Analysis System (HOAS) by the Ministry of Municipal Affairs and Housing in co-operation with the City of Toronto Planning Development Department yielded some hitherto unavailable information on deconversions and reversions of rental properties to owner-occupant status for the City of Toronto.[1] Unfortunately, the available data precluded any analysis of rental stock losses outside of the six case study areas.

This section commences with a description of overall housing stock and tenure changes in the City of Toronto, highlighting rental stock losses through demolitions, conversions to owner-occupancy and deconversions. This description establishes the framework for the types of rental stock losses and sets the stage for the later discussion of rental stock losses in the other case study areas due to demolitions and condominium conversion.

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[1] See Volumne 12 on Data Sources and Problems for a description of the Housing Occupancy Analysis System.

## 2.0 STOCK AND TENURE CHANGES IN THE CITY OF TORONTO

A significant amount of rental stock was lost in the City of Toronto in the 1976-1981 period. Some of this loss occurred as a result of demolition or conversions of rental dwellings to non-residential uses, but more significant was the loss of rental stock due to deconversions which occurred primarily as a result of the process of gentrification. Before grantifying the rental stock losses, it is mistructive to review the data sources and concepts behind City of Toronto housing stock and tenure changes presented below.

The Housing Occupancy Analysis System (HOAS) facilitates analysis of housing stock and tenure changes in a municipality by examining, on a property-by-property basis, the numbers of dwelling units and their tenure at two different periods. HOAS utilizes assessment records which classify all occupied properties into three tenure categories:

- Owner-occupied;
- Owner-tenant; and
- Tenant-occupied.

The owner-occupied and tenant-occupied categories are self-explanatory - they relate to properties in which all units are either owner-occupied or rental. "Owner-tenant" relates to properties where both the owner and a tenant reside. The assessment definition of dwelling unit appears to be more liberal than that used in the Census of Canada, so the dwelling unit counts are higher and many properties which the Census would count as owner-occupied dwelling units with a boarder or lodger would be counted in the assessment records as owner-tenant properties with two or more dwelling units. The definitional difference can be illustrated with reference to the 1981 housing stock figures by tenure from both the Census and the assessment records for the City of Toronto.

Table 2.0 Occupied Dwelling Stock By Tenure
City Of Toronto, 1981 (000's Of Dwelling Units)

| | Census of Canada | Assessment | Difference |
|---|---|---|---|
| Owner-Occupied | 98.3 | 87.3 | -11.0 |
| Owner-Tenant | - | 35.6 | +35.6 |
| Tenant-Occupied | 143.0 | 139.3 | - 3.7 |
| Total Occupied Stock | 241.3 | 262.2 | +20.9 |

Source: 1981 Census of Canada and Housing Occupancy Analysis System, City of Toronto Planning and Development Department.

It seems likely that the vast majority of the 20,900 unit difference between the total dwelling stock figures yielded by the two sources consists of rented living quarters in converted dwellings which do not meet the more strict Census definition of a dwelling unit.

Unlike the approach taken in the sections of this study that relate to the physical potential of the stock for conversion, this section utilizes the more liberal assessment figures for dwelling units, rather than standardizing the figures to correspond with the Census of Canada stock figures.

The occupied dwelling stock in the City of Toronto increased by 6,300 units over the 1976-1981 period. The increase was concentrated in the owner-occupied and tenant-occupied properties which each increased by 7,500 units or more; the owner-tenant category (the category with converted units) declined by 9,400 units.

Table 2.1 Assessment Dwelling Stock By Tenure
City Of Toronto, 1976 And 1981 (000's Of Dwelling Units)

| | 1976 | 1981 | Change |
|---|---|---|---|
| Owner-Occupied | 79.1 | 87.3 | +8.2 |
| Owner-Tenant | 45.0 | 35.6 | -9.4 |
| Tenant-Occupied | 131.8 | 139.3 | +7.5 |
| Total Occupied Stock | 255.9 | 262.2 | +6.3 |
| Vacant | 5.6 | 6.5 | +0.9 |
| Total Stock | 261.5 | 268.7 | +7.2 |

Source: Housing Occupancy Analysis System, City of Toronto Planning and Development Department.

These overall changes mask a number of distinct trends within the existing stock. Among the most notable of these trends (summarized from the table below) during 1976-1981 are:

- 8,200 dwelling units were lost from the total stock which was in place in 1976:
  - 3,100 of these units lost were in properties which were either demolished or converted to non-residential uses;
  - the remaining 5,100 units lost represented mainly net deconversions of buildings from multiple unit occupancy to single unit occupancy.

. These units lost were more than replaced by the construction of new properties which added 15,400 new dwelling units during the period so the overall increase in dwellings was 7,200 units.

. A substantial amount of deconversion activity occurred during the period in the 45,000 units in owner-tenant properties in 1976; an examination of these same properties in 1981 yields the discovery that:

- 22,100 units were still in owner-tenant status;
- 11,100 units switched to owner-occupier status with no tenants;
- 5,600 units were totally tenant-occupied in 1981;
- 700 units were lost due to either demolition or conversion of the property to non-residential purposes;
- about 5,000 units were lost due to other reasons (most likely deconversion of the property); and
- 500 units were vacant; many of these would be vacant second units rather than totally vacant buildings.

. Offsetting the number of dwelling units lost in previously owner-tenant buildings, a number of previously totally owner-occupied or tenant-occupied properties switched to the owner-tenant category in 1976-1981; in 1981 there were 7,000 owner-tenant units in what previously were owner-occupied buildings and 5,900 owner-tenant units in what previously were tenant-occupied buildings. Unfortunately, it is not possible to establish how many new units were created in this process but it seems certain that at least some of these units are newly created second or third units in what was previously a one unit property.

. Switches of tenure between owner-occupied and tenant-occupied properties largely offset each other in 1976-1980; 4,900 units switched from owner-occupancy to tenant-occupancy while 5,800 units switched from tenant-occupancy to owner-occupancy.

These and other trends are illustrated in the following table which concentrates on changes in Toronto's 1976 dwelling stock during the 1976-1981 period.

Table 2.2 Changes In 1976 Assessment Dwelling Stock
City Of Toronto, 1976 - 1981 (000's Of Dwelling Units)

| | Occupied Stock by 1976 Tenure | | | | | |
|---|---|---|---|---|---|---|
| | Owner-Occupied | Owner-Tenant | Tenant Occupied | Total Occupied Stock | Vacant | Total Stock |
| 1976 Stock | 79.1 | 45.0 | 131.8 | 255.9 | 5.6 | 261.5 |
| Changes 1976-1981 | | | | | | |
| Demolitions and Conversion to Non-Residential | -0.3 | -0.7 | -1.6 | -2.6 | -0.5 | -3.1 |
| Other Reasons | +0.3 | -5.0 | -1.0 | -5.7 | +0.6 | -5.1 |
| 1976 Stock Remaining in 1981 | 79.1 | 39.3 | 129.2 | 247.6 | 5.7 | 253.3 |
| Stock Remaining in 1981 by Tenure in 1981 | | | | | | |
| Owner-Occupied | 65.8 | 11.1 | 5.8 | 82.7 | 1.9 | 84.6 |
| Owner-Tenant | 7.0 | 22.1 | 5.9 | 35.0 | 0.5 | 35.5 |
| Tenant-Occupied | 4.9 | 5.6 | 115.0 | 125.5 | 2.5 | 128.0 |
| Total Occupied Stock | 77.7 | 38.8 | 126.7 | 243.2 | 4.9 | 248.1 |
| Vacant | 1.4 | 0.5 | 2.5 | 4.4 | 0.8 | 5.2 |
| Total Stock | 79.1 | 39.3 | 129.2 | 247.6 | 5.7 | 253.3 |

Source: Housing Occupancy Analysis System, City of Toronto Planning and Development Department.

Clearly, there has been a severe rundown in the owner-tenant dwelling stock in 1976-1981 with many of the dwellings being deconverted to owner-occupant use. The loss of these units has occurred for a number of reasons including the process of gentrification.

The households which were generally considered to be receptive to renting out portions of owner-occupied dwellings (owner-tenant dwellings) were often part of the various ethnic groups residing in inner-city neighbourhoods. However, over the past decade, the number of people in the City of Toronto reporting a mother tongue other than English has fallen by 51,000. Many of the inner-city residents who were homeowners in the neighbourhoods undergoing deconversion and gentrification sold their houses and moved to the suburbs, just as the parents of baby-boom generation had done 25 years previously. During the last ten years the non-English speaking population grew by 126,000 in Metro Toronto, outside the City of Toronto, and by 112,000 in the surrounding regional municipalities.

The net effect of the trend to smaller household sizes, gentrification and deconversion has been a decrease in the number of dwelling units in the existing housing stock. Replacement of these deconverted units with conversions or new units was insufficient to offset a marked decline in the owner-tenant stock in the 5-year period. The table below further illustrates the trends in the existing stock as well as new additions to the stock in 1976-1981.

Table 2.3 Changes In Assessment Dwelling Stock By Tenure; City Of Toronto, 1976-1981 (000's Of Dwelling Units)

| | 1976 Stock | | New Additions To Stock 1976-1981 | 1981 Stock |
|---|---|---|---|---|
| | In 1976 | In 1981 | | |
| Owner-Occupied | 79.1 | 84.6 | 2.7 | 87.3 |
| Owner-Tenant | 45.0 | 35.5 | 0.1 | 35.6 |
| Tenant-Occupied | 131.8 | 128.0 | 11.3 | 139.3 |
| Total Occupied Stock | 255.9 | 248.1 | 14.1 | 262.2 |
| Vacant | 5.6 | 5.2 | 1.3 | 6.5 |
| Total Stock | 261.5 | 253.3 | 15.4 | 268.7 |

Source: Housing Occupancy Analysis System, City of Toronto Planning and Development Department.

It is evident that, despite the 11,300 new units added to the rental stock in 1976-1981, rental stock losses due to deconversion, demolition or conversion to owner-occupancy status have resulted in a small decrease of 1,900 units in the total rental stock in the 5-year period from 1976 to 1981.

Owner-occupied stock on the other hand increased by 8,200 units despite the fact that only 2,700 new owner-occupied units were added in 1976-1981. The majority of the discrepancy is comprised of switches from the owner-tenant category.

There is a wealth of information available from HOAS both at the City-wide and ward levels. The table below presents information on the size of the owner-tenant stock by ward in 1976 and 1981.

Table 2.4 Occupied Owner-Tenant Stock;
City Of Toronto Wards, 1976-1981 (000's Of Dwelling Units)

| Wards | Owner-Tenant Stock - 1976 | Owner-Tenant Stock - 1981 | Change 1976-1981 |
|---|---|---|---|
| 1 | 4.7 | 4.6 | -0.1 |
| 2 | 6.2 | 5.3 | -0.9 |
| 3 | 5.4 | 3.6 | -1.8 |
| 4 | 7.4 | 6.1 | -1.3 |
| 5 | 4.9 | 3.7 | -1.2 |
| 6 | 3.3 | 2.3 | -1.0 |
| 7 | 2.2 | 1.4 | -0.8 |
| 8 | 3.7 | 2.3 | -1.4 |
| 9 | 2.8 | 2.3 | -0.5 |
| 10 | 2.3 | 2.0 | -0.3 |
| 11 | 2.1 | 1.4 | -0.7 |
| City of Toronto | 45.0 | 35.0 | -10.0 |

Source: Housing Occupancy Analysis System, City of Toronto Planning and Development Department.

It is evident that deconversion of this owner-tenant stock is occurring throughout the City; however, the most active wards (in terms of deconversions) appear to be Wards 3, 4, 5, 6 and 8. The wards with the majority of the owner-tenant stock are Wards 1-5 with two-thirds of the stock in 1981; but all wards have at least some owner-tenant properties.

The overall trends in the owner-tenant stock in 1976-1981 can also be presented by ward. The highlights in these trends by ward are presented below though (for the sake of space) no additional exhibits are presented.

- Of the 11,100 owner-tenant units which switched to owner-occupancy in 1978-1981, the most active wards were:
  - Wards 3 and 4 with 2,000 each,
  - Wards 2 and 8 with 1,400 and 1,300 respectively, and
  - Wards 1 and 5 with 1,100 each.
- Switches of properties from owner-occupancy to owner-tenant status totalled 7,000 during the period for the City as a whole, this was most prevalent in Ward 4 (1,300 units), Ward 3 (1,100 units) and Ward 2 (1,000 units).
- Switches from tenant-occupancy to owner-tenant totalled 5,900 in 1976-1981; 1,200 of these occurred in Ward 1.
- Losses to the owner-tenant stock due to demolition or conversion to non-residential were most prevalent in Ward 6 which accounted for 550 of the 700 losses.
- Vacant units in the owner-tenant stock are concentrated in Ward 7 with almost 300 of the 500 vacant units in the City.

The HOAS offers a unique new opportunity to analyse the changing occupancy patterns within the existing housing stock, the analysis presented here really only scratches the surface of the possibilities.

## 3.0 DEMOLITIONS AND CONDOMINIUM CONVERSIONS

The HOAS information presented earlier does not specifically identify total or rental stock losses due to demolitions or condominium conversions. They are, however, included in some broader categories; referring to the table "Changes in 1976 Assessment Dwelling Stock":

- Demolitions are included in the category "Demolitions and Conversion to Non-Residential Buildings" which totalled 3,100 units in the City of Toronto over the 1976-1981 period; 1,600 of these units were tenant-occupied in 1976;
  - statistics provided from another data source within the City of Toronto Planning and Development Department indicate that demolitions of dwellings of all tenure types during the 1976-1981 period totalled 1,413 dwelling units. So, clearly, almost as much stock is being lost through conversion to non-residential uses as through demolition.[1]
- Condominium conversions are included in the 5,800 dwellings which were tenant-occupied in 1976 but which had switched to owner-occupancy by 1981 (though some of the condominium units which resulted would, no doubt, have been subsequently rented out);
  - according to the City of Toronto Planning and Development Department, there were a total of 638 units converted from rental to condominium tenure in the City of Toronto in the 1976-1981 period. It appears that except for condominium conversions, switches from ownership to rental almost balance the switches the other way.[2]

In total, relatively little stock is lost because of demolitions and condominium conversions; the following table presents estimates of losses due to these factors along with the 1981 Census of Canada figures for the total rental stock in each case study area (except Woodstock).

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[1] The 1,413 units refer to the six calendar years 1976-1981 whereas the HOAS refers to the five year period intervening these years.

[2] With the exception of a 6 unit building in 1981, all these condominium conversions occurred in 1976.

Table 3.0 1981 Rental Stock By Dwelling Type And 1976-1981 Demolitions And Condominium Conversions Case Study Areas (Dwelling Units)

| | Toronto | North York | Hamilton | Ottawa | Kingston |
|---|---|---|---|---|---|
| 1981 Rental Stock | | | | | |
| Row and Apartment | 116,720 | 85,330 | 40,880 | 62,080 | 9,970 |
| Other | 26,280 | 5,410 | 8,805 | 12,065 | 2,325 |
| Total | 143,000 | 90,740 | 49,685 | 74,145 | 12,295 |
| Demolitions 1976-1981 | | | | | |
| Row and Apartment | 785 | 227* | 82 | 259 | 47 |
| Other | 628 | 742 | 729 | 454 | 65 |
| Total | 1,413 | 969 | 811 | 713 | 112 |
| Condominium Conversion | | | | | |
| 1971-1975 | 109 | 1,347 | 853 | n/a | 24 |
| 1976-1981 | 638 | 526 | 1,591 | 238 | 108 |

* Dwelling unit information was not available; thus was estimated using square footage data.

Source: 1981 Census of Canada and unpublished information from case study municipalities.

Unfortunately, demolition data do not disaggregate by tenure, however, even if it is assumed that all row and apartment demolitions and half of other demolitions are rental units, the rental stock losses from both demolition and condominium conversion have been relatively small.

- In North York, only about 600 rental units were lost over the 1976-1981 period due to demolition and a further 526 units were lost due to condominium conversion; this combined loss of 1,126 units represented 1.2 percent of the 1981 stock. Despite these losses, the total occupied rental stock in North York increased by 7,600 units in the 1976-1981 period.

- Hamilton's rental stock demolitions in 1976-1981 are estimated at about 450 units with a further 1,591 units lost due to condominium conversion; the combined loss of 2,041 represents just over 4 percent of the 1981 rental stock. Hamilton's occupied rental stock increased by 4,200 units between 1976 and 1981.

- Ottawa had about 500 rental unit demolitions in 1976-1981 with condominium conversions totalling 238 units; the total estimated rental stock loss due to these factors (738 units) represented only 1 percent of the 1981 rental stock. The occupied rental stock in Ottawa increased by 5,250 units during the 1976-1981 period.

- In Kingston, about 80 rental units were demolished and a further 108 units were converted to condominiums over the 1976-1981 period; the combined loss of 188 units from these sources represents about 1.5 percent of the 1981 rental stock. Kingston's occupied rental stock increased by only 200 units in 1976-1981 so replacement of these lost units represented about half of the new production.

- In Toronto, only about 1,100 rental units were lost due to demolitions. Adding on the 638 units converted to condominiums, the 1,738 units lost due to these two factors account for 1.2 percent of the 1981 rental stock. Over the 1976-1981 period, Toronto's occupied rental stock increased by 8,100 units.[1]

Clearly, rental stock losses due to demolitions and condominium conversions have been marginal in 1976-1981. However, it must be borne in mind that condominium conversions are now severely restricted in most centres and, if such restrictions were not in place, substantially more conversions would likely occur. It must also be recognized that each of these units lost either through demolition, condominium conversion - or deconversion of grade-related dwellings - must be replaced by a high-cost and high rent new unit with consequent impacts not only on tenants but on society as a whole.

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[1] This estimated rental stock increase is from Census of Canada figures. The increase estimated from assessment figures in Table 2.1 was 7,500 units; the difference is no doubt due primarily to definitional differences.

# PART 4.1.2

# SOCIAL IMPACT OF RECENT & FUTURE GRADE-RELATED RENTAL STOCK LOSSES

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## 4.1.2 SOCIAL IMPACT OF RECENT & FUTURE GRADE-RELATED RENTAL STOCK LOSSES

### 1.0 INTRODUCTION

An examination of the potential and constraints faced in increasing Ontario's housing stock through the conversion of existing homes within well-established and fully developed cities, cannot be considered complete without a thorough examination of the opposite process, i.e., the process of the deconversion of existing multi-unit homes into homes that contain fewer units or a single family only. This process of deconversion, known as "gentrification" or "white painting", is a well established phenomenon in many of Ontario's larger cities. Directly related to this process is the loss of housing stock due to changes in land use from residential to commercial and the demolition of houses to make way for other types of development.

There are three reasons why an examination of gentrification is an important part of a study which seeks to encourage the creation of additional housing units through conversion.

- The process of gentrification has the opposite effect of that intended as an outcome of this study, in that it reduces rather than increases the number and affordability of housing units within the existing stock. Therefore, the process must be thoroughly understood in order to evaluate the likely strength of this market phenomenon versus the direction intended by the study.
- The process of gentrification has created both positive and negative results. It is important to understand both of these results as an integral part of this study, which seeks to intervene in the process of existing neighbourhood change. It is particularly important to understand the negative effects of gentrification in order to seek solutions where these are necessary.
- The process of conversion presupposes a general upgrading and conservation of the existing housing stock. However, there is a danger that some of the same potentially negative social results of gentrification can also occur through government programs which encourage conversions. These negative results must be analyzed, understood and then taken into account before any new programs to encourage conversions are proposed.

## 2.0 THE PROCESS OF NEIGHBOURHOOD CHANGE

Cities are constantly changing. Neighbourhoods which were once the most exclusive parts of town become run down and occupied by the poorest people. The same neighbourhoods fifty years later are taken over by commercial development, high rise towers or once again become valued as homes for the wealthy. Industries which were once tied to the core areas where the railways carried both their product and their materials, move to the suburbs to the spacious industrial parks which provide easy access to the modern highway. The old downtown industrial buildings become homes for artists, for restaurants and fashionably-renovated professional offices. These changes continue to occur in all parts of all cities as they adapt over time to the needs of our society.

The forces which give rise to the process of urban change are complex. They derive from a combination of technological change, political pressure, governmental policy and private investment decisions. Just as it is true that the automobile created the conditions for the growth and spread of the North American suburb, it is equally true that government encouragement and assistance to home ownership, combined with a period of massive immigration, allowed the suburbs to develop.

Many of the older inner neighbourhoods in Ontario cities have been through three or four completely different life cycles. They began as the homes of the wealthy in the days before the automobile and public transit. As private and public transportation alternatives developed, the wealthy moved outward, away from the factories and offices of the downtown and into the openness and greenery of the suburbs. Their housing was then converted into housing for working people who were needed to operate the growing industrial and commerical base of the city. Thus the houses were divided up to accommodate poorer people, newly arrived immigrants, migrants from the countryside and from other provinces.

The inner residential neighbourhoods retained their function as an arrival place as well as a permanent location for those with no other housing alternatives. Large houses became rooming houses or cheap flats. The general environmental quality of these old inner-city neighbourhoods declined and was considered undesirable, particularly by those who controlled power in the cities and who now lived in the suburbs.

The old inner-city neighbourhoods surrounded the downtown commercial centre and became the logical area for the expanding commercial centre or for land uses directly related to central city functions. Also, the generally poor environmental quality of these residential neighbourhoods detracted from the potential of the centre and discouraged investment.

The most obvious force for change was that of complete redevelopment. Land values in these inner-city residential neighbourhoods were low and demand for new facilities close to the downtown was potentially great. Thus, proposals for major and minor redevelopment have continued to change the face of these neighbourhoods since the early 1950's. The results have been dramatic changes in land use, from residential to commerical or institutional, or from low-rise houses to high-rise apartments.

The most dramatic action during this period of change was the utilization of urban renewal by governments. This process allowed public power and funds to wipe out whole neighbourhoods and turn them over to public and/or private interests for complete rebuilding. The theory under which governments operated was that the existing neighbourhoods represented such a severe disincentive to redevelopment and investment that public sector initiative was required to clear the way and create conditions for change.

The fate of inner-city neighbourhoods, until the end of the 1960's, appeared to be sealed. Decay, abandonment, and demolition, was the fate of many inner-city neighbourhoods. Large scale urban redevelopment at substantially higher densities took the place of small-scale residential structures.

A number of social, economic and political events coalesced in the late 1960's and early 1970's to halt the patent destruction of inner-city neighbourhoods. The following section explores the socio-political, demographic and economic conditions which lead to reinvestment in many inner-city neighbourhoods while saving the low-rise housing form and completely altering the socio-economic composition of these neighbourhoods.

## 3.0 PRE-CONDITIONS FOR INNER-CITY RESIDENTIAL GENTRIFICATION

It became increasingly clear that urban renewal was an unacceptable physical and social solution for dealing with neighbourhood change. Often the problems were exacerbated by higher densities and an alienating living environment. The high-rise buildings of the modern movement which resulted in large expanses of under-utilized open space, reliance on the automobile and a sterile pedestrian environment came under heavy attack. The loss of historically significant residential neighbourhoods to the wrecker's ball began to sensitize people to the consequences of the modern alternative carried to its ultimate conclusion.

The destruction of inner-city neighbourhoods and consequent displacement of residents served to politicize the people directly affected. Neighbourhood associations, ratepayer groups and tenant organizations were soon organized. They became a politically significant counter-balance to the interests of urban renewal and effectively halted the process.

An important factor which helped create the conditions for renewed investment in the remaining inner-city older housing stock was the changing preferences of a portion of the baby boom population. The post-World War II baby boom population was nurtured largely in the affluent suburban setting of the nuclear family. This population cohort became the most highly skilled and educated generation in history. For many, the inner-city environment was relatively unknown until they left home to enter post-secondary institutions which were very often located in the inner-city. The rejection of the suburban environment by many people of this generation was an outgrowth of the discontent and the desire to explore new lifestyles that surfaced in the 1960's. A renewed interest in cultural and historic roots could be nourished vicariously through the return to the inner-city.

Yet another important influence in the socio-economic composition of inner-city neighbourhoods has been the accelerated locational adjustments of various industrial sectors. Traditional blue collar employment continued to disperse from inner-city locations which it predominated during the 19th and early 20th century. Managerial and white collar employment opportunities, however, continue to expand in the central city. These locational adjustments in employment have led to related adjustments in residential settlement patterns.

The revitalization of inner-city neighbourhoods has been made possible by a portion of the educated baby-boom cohort who have taken up the white collar employment opportunities which have arisen in the inner-city. These opportunities were combined with the genuine desire on the part of many to reside at inner-city locations close to their places of employment, where housing opportunities were initially relatively inexpensive.

## 4.0 THE PHENOMENON OF RESIDENTIAL GENTRIFICATION

The term "gentrification" has been borrowed from the British. It serves as the most appropriate term to identify a particular housing phenomenon that has been occurring in a large number of cities to varying degrees. The only dictionary definition appears in the 1980 Oxford American Dictionary:

> "gentrification, n., a movement of middle class families into an urban area causing property values to increase and having the secondary effect of driving out poorer families."

Gentrification is alternatively viewed as part of a process of private urban renewal, urban or housing rehabilitation, inner-city revitalization, urban conservation, and by several local names - whitepainting (Toronto), brown stoning (New York), and trendification (Austrialia)(20). All of these terms give an indication of what has occurred in many low income inner-city neighbourhoods, but none pinpoint it exactly. For purposes here, the dictionary definition will be used, with one qualification: families are the exception as the in-movers. The predominant household type of "gentrifier" is not a middle class family, but rather a professionally employed couple, or one of several alternative lifestyle groups.

Physical changes relating to gentrification are the 'deconversion' of a house, reducing the number of overall housing units by altering an older, already altered structure from a subdivided use into a one or two unit structure. In neighbourhoods close to the downtown, particularly those along major roads, existing houses also became the natural target for conversion from residential to commercial for retail stores, professional offices, etc. In such areas the pressure from the downtown can also mean the demolition and redevelopment of existing houses to make way for new buildings which are often non-residential.

Profiles of gentrifiers from a number of studies have indicated that the largest percentage tend to be college educated, young professionals - i.e. the matured 'baby boom' age cohort.[3] It is not a 'back-to-the-city' movement, as touted by the press, but rather is composed largely of suburban-raised individuals who moved to the city for their education and stayed. Upon entrance into the housing market after beginning a career, the housing choices for this large group of individuals were limited to the newer suburbs which are farthest away from employment centres or the inner-city.

The types of neighbourhoods which are most vulnerable to gentrifiction can be defined as follows:

The City:

. Must have an historic and/or attractive central area.

- A high proportion of office and professional employment, concentrated in the downtown core must be present.
- A tight housing market is conducive.

The Neighbourhood:

- Older housing stock with some structural or architectural merit is needed. The greatest number of "gentrified" structures date before 1920.
- There must be some inner city amenities present (e.g. parks, historic attractions, etc.).
- An absence of racial strife is generally a requirement.
- Relative difficulties in commuting to the newer suburbs - due to great distances involved, lack of an efficient highway network, etc. may be a major factor, as evidenced by Boston, Philadelphia, San Francisco, London, etc.

Economic Status:

- Quite often a perceived investment potential, which will accelerate the turnover rate is present.
- There must be particular accessibility and price attributes present for gentrification to occur on a large scale.

## 5.0 PHYSICAL AND SOCIAL IMPLICATIONS OF GENTRIFICATION

Inner-city neighbourhoods experiencing gentrification undergo a process of considerable improvement and rehabilitation of their housing stock. As middle income groups seek proportionately more space than the former working class inhabitants, single family dwellings previously occupied by possibly two families are deconverted to accommodate just one family; rooming houses with 10 rooms can become two or three apartments. This process will lead to greater neighbourhood heterogeneity and diversificiation, at least in the initial stages. Where neighbourhoods are predominantly of ethnic or other homogeneous composition, greater heterogeneity will result from the in-migration of individuals, couples and families with incomes above those of the existing neighbourhood.

Heterogeneity will be characterized by more diverse incomes, family composition and ethnic composition. Depending upon the intensity of neighbourhood gentrification, the displacement of original working class residents may continue to the point where such neighbourhoods once again become relatively homogeneous with respect to incomes but probably not with respect to family composition and ethnicity.

This process of neighbourhood change leads to rising property values which in themselves are determined by both physical improvements and a neighbourhood's attractiveness to higher income groups. The increase in property values produces higher tax assessments, thus creating a more financially secure municipal tax structure.

Neighbourhood gentrification is more than the physical improvement of private property. Increased tax revenues have provided funds for improved landscaping on public boulevards, new neighbourhood parks, cosmetic improvements to sidewalks and other such improvements. Municipalities have often provided funds for local merchants to organize business associations which form common marketing strategies and lobby for physical improvements to their commerical districts. These efforts are often reinforced by the increased purchasing power of neighbourhood residents who have recently moved into neighbourhoods adjacent to traditional commercial strips.

For the "gentrifier", the results of gentrification include the deconversion of a multi-unit under-maintained house with a myriad of problems. These may necessitate re-roofing, re-wiring, re-plumbing, etc., but after a substantial investment the resulting older property has dramatically increased in value. If the gentrification "movement" is large enough, i.e. at least a small number of individuals rehabilitating their houses in a limited relatively contiguous geographical area, the consequent effect will be an "up-filtering" of the housing stock in terms of value and of the socio-economic status of the neighbourhood. Increased accessibility to the social and cultural amenities the downtown core has to offer encourages these "gentrifiers" to cope with the problems of small lots, small houses and parking problems associated with these inner-city neighbourhoods.

The remaining residents experience a separate set of effects as a result of gentrification. If they have been able to hold on to their homes (generally older homeowners, as the tenant households will have been displaced), they may begin to feel pressure to sell, or to "fix up" their houses to meet the new neighbourhood standards. Increased alienation in their neighbourhood over a period of time may eventually pressure these residents to sell their homes at prices that they may perceive to be good, but in the current housing market the price is often not high enough to enable them to buy replacement housing.

The greatest problems occur for tenants who formerly lived in "gentrified" neighbourhoods who have been forced out through the process of gentrification, change to commercial use or demolition. This is largely due to the absentee landlord ownership patterns of inner-city neighbourhoods ripe for gentrification, which contain a large tenant population. This tenant group generally consists of low income singles, single parent households, or non-family groups of individuals sharing a house to reduce rental costs.

Certain members of this group are not disadvantaged as greatly as others when the gentrification process takes place. Young people who have just entered the labour market who share a house or live in rooming house accommodation in order to save on housing costs, are more likely to be able to find alternative housing (e.g. a shared flat or apartment), than are the chronic low-income or welfare members of this group. It is these latter individuals who are the most visible victims of the gentrification process and it is this group which will be dealt with in greater detail in section 6.0 of this paper. However, it should be clearly understood that the process of gentrifiction has repercussions for groups in society other than those at the lowest end of the income scale.

One major result of gentrifiction, therefore, is the disappearance of a traditional and desireable form of housing for a group of people who may indeed have other housing options, but whose options are now greatly reduced. This group and middle income groups are locked into competition for scarce rental accommodation usually in high-rise apartments. The competition limits the options and obviously excludes the low-income group at the bottom. It is this group which turns to government for assistance in order to find suitable shelter.

Encouragement of the conversion of existing housing by governments will likely result in an upgrading of existing housing and the addition of more units to the housing stock, creating more accessible housing opportunities for individuals who can afford these options. The low income individuals characterized as displacees due to gentrification, either those who have already been displaced but are now living in other inner-city neighbourhoods, or those who have not yet been affected but live in target neighbourhoods, face a real threat. Conversion programs can create the same pressures as gentrification. The problem here is not the quality nor even the quantity of housing stock, but rather the affordability.

The present difficult economic conditions have combined with the process of gentrification, or more importantly deconversion, to produce both social and housing crises for a growing population in our society. This population consists of those socio-economic groups which have traditionally found refuge in inner-city accommodation such as rooming houses, multiple unit houses, older apartment buildings and older hotels. The consequences for the displacees and the changing inner-city housing conditions were investigated through a series of key interviews discussed in the next section. The diminishing housing options and resultant social and psychological disruption for these segments of the population is probably the most tragic side effect of the inner-city residential gentrification process which has resulted in considerable improvements to many neighbourhoods.

## 6.0 PERCEPTIONS OF THE HOUSING PROBLEM FACED BY LOW INCOME SINGLES

In recognition of the social and housing related consequences of gentrifiction for particular groups in society it was considered essential to investigate these trends further. In the absence of any data and/or studies, interviews were held with more then 40 key people associated with social and governmental agencies responsible for or indirectly involved in the housing needs of those unable to afford or find suitable accommodation. Personnel from non-profit housing agencies, United Way social agencies, City, Regional and Provincial agencies, and church organizations were interviewed in Metropolitan Toronto and in the Ottawa region. The first hand experiences of these agencies corroborates the preceding analysis, provides invaluable insight into the problems and offers direction for appropriate policy responses.

The overriding conclusion drawn from discussions with the key informants was that low income individuals and families face extreme difficulties directly as a result of the loss of a large supply of inexpensive housing in the inner residential neighbourhoods of Ottawa and Toronto. There is a direct relationship between the intensity of the problems experienced and the degree to which the inner-city neighbourhoods have been gentrified. This includes houses being converted to commercial uses, the conversion or demolition of old cheap hotels and other demolitions.

The group which is most in need is the single person or couple below the age of qualification for senior citizen housing. These people are not eligible for any direct housing assistance from government and are left to fend for themselves or turn to emergency housing as a last resort.

### 6.1 Perception of Need

Virtually all employees or volunteers from housing agencies interviewed emphasized that the demands on their services have increased significantly over the past 5 to 10 years and particularly in the last 2 years. The types of housing operated and/or supplied by these agencies were under pressure not only from their usual client groups but also from other segements of the population who previously had not placed a demand on their services. The problem is a lack of supply of suitable housing and care for low income groups in society. In some cases it is a question of supply and in others it is a straightforward affordability problem. The problem has worsened considerably in recent years due to the poor economic conditions of the country, resulting in very high levels of unemployment.

Officials from one agency after another provided graphic instances of how the housing crisis has led to malnutrition, sleepless nights, and simply no place to go for an increasing number of people. They indicated that many of the homeless were sleeping on the streets, in garages, over building hot air vents and in alleys. There has been a tremendous jump in the number of emergency cases in the last few years. Each key interview produced both individual stories of need and estimates of how many people are being affected. The collective experience of all the agencies is that the need is increasing, more people are being turned away and more people are being accommodated in unsuitable conditions. A survey undertaken in June 1982 by the Metropolitan Toronto Planning Department produced a conservative estimate of 3,440 homeless individuals in Metro Toronto during that month (35).

## 6.2 Perception of the Causes

Many key informants described how the process of gentrification gradually wiped out the supply of cheap rental accommodation. They had no doubt as to the direct relationship between the process of gentrifiction and the steady deterioration of the housing situation for low income single people. The study undertaken by the Metro Department of Planning in June 1982 indicated that 52% of those then living in hostels, (whose previous accommodation was known), had been displaced from private rooms or apartments due to eviction or rent increases. A further 25% had come from other hostels, 8% from family homes (a result of domestic problems), 7% from the institutions and 7% from the street. (35)

Key informants pointed again and again to the rooming house as being the ideal type of accommodation for singles. This type of housing was cheap, often well-located to the social infrastructure of low income singles, variable in terms of the kinds of service offered with shelter, flexible in terms of rental term and lifestyle, etc. However, this form of housing has been drastically reduced in Toronto and is well on its way to disappearing in Ottawa. Old hotels which served a similar and important function for this group are also being lost rapidly. Whole neighbourhoods which contained a majority of rooming houses have now been reduced to one or two every few blocks.

The rooming houses have been wiped out through gentrification and building code enforcement. Fires in rooming houses or unsanitary conditions have led to municipalities requiring that landlords make substantial investments in their old houses to bring them up to a certain level of safety. The capital investment is rarely justified when the market served continues to be low income single persons. Therefore, such code enforcement usually results in upgrading the building to a high quality rooming house or more often to a number of expensive apartments. The hotels disappear as market conditions dictate that the time for redevelopment is ripe, particularly as property values in surrounding areas rise.

Virtually no new rooming houses are being created as the returns will not justify the investment. There is general agreement that the private market is rapidly and permanently disappearing as a source of housing for low income single people and families. Municipal non-profit housing corporations such as Cityhome in Toronto and City Living in Ottawa are no longer permitted to purchase existing rooming houses. The present non-profit program would not allow all rents in a given building to be sufficiently low to accommodate single people in need, even if the non-profit agencies were again permitted to purchase such buildings. In any event, single people below the age of eligibility for senior citizen housing do not qualify for the rent supplement program.

The neighbourhood in the process of gentrification often becomes hostile to existing rooming houses and old hotels, and is particularly hostile to allowing new ones. Neighbourhood plans and N.I.P. programmes have resulted in much public and private investment in communities over the recent past. Now residents want the return of the family and want to exclude rooming houses. Accommodation for singles in group homes or similar living situations has met with substantial and hostile neighbourhood opposition in many areas.

In both Ottawa and Toronto recent iniatives undertaken, in the one case by a voluntary agency and in the other by the City, have led to strong opposition from local residents. There is no acceptance by the community of these groups of tenants, even in neighbourhoods in which they once predominated.

A major influence which has led to an increased demand for emergency shelter and long-term low-cost housing in recent years is the significant increase in levels of unemployment. Higher unemployment in regional, non-urban areas has induced rural-to-urban migration for many unemployed workers. Upon arriving in the City they discover accommodation is either too expensive or unavailable in the price range they can afford. Consequently, temporary shelters have been inundated with migrants unable to find accommodation.

The City of Toronto Housing Department has received a substantial increase in applications from young singles attempting to secure housing through Cityhome. The units that are available from Cityhome for singles do not market very well, as the rents charged must be set too high for the singles who are in need. One response has been the sharing of some family units by unrelated tenants. This serves to reduce monthly rents for singles in Cityhome projects while reducing the availability of units that would normally be rented by families. According to Cityhome officials, approximately one-quarter of the people who approach the housing agency are turned away because they cannot be offered direct housing assistance under the criteria established by senior governments.

Related to the generally poor performance of the economy is the lack of rental construction. City of Toronto planners point out that private sector rental construction in 1981 was virtually non-existent. Although any such rental units would not be accessible to the low income groups considered here, the additional rental construction could assist the overall rental vacancy rate and thereby indirectly assist low-income groups. The exess demand has had the effect of squeezing out lower income groups in favour of people who can afford to pay higher rents. Rents in existing units are also being increased as a result of the very tight rental market. Landlords are able to undertake whole building renovations and thereby upgrade the building and displace low income tenants through large rent increases. Rent increases beyond rent review levels may go unchallenged as people are afraid that they will lose their accommodation.

Amendments to the Landlord and Tenant Act which granted strong security of tenure protection to tenants have discouraged many home owners from renting out rooms, particularly in their own homes. According to room registry agencies, small landlords are easily discouraged by one bad experience such as considerable frustration and delay in getting a troublesome tenant to move out. They often choose to keep the space empty rather then risk another bad experience in their own home.

## 6.3 Where do people go

There has been no systematic analysis or study of where the displaced people move. Those who can afford it will simply be forced to pay a larger proportion of their income on housing and seek more expensive accommodation in available apartments.

Key informants indicated that many displaced people are relying increasingly on social agencies and institutions to provide them with shelter or assistance in finding housing. Those found on the streets are the bottom of the heap, however, they represent only a fraction of those in difficulty. People are doubling-up with friends or relatives or they are moving to lower-rent suburban locations. According to one CMHC official some suburban areas are becoming the last ditch safety valve; old walk-up apartments in these areas are in some cases still accessible to low income working people. Where people remain in the city they are forced to double-up in already over crowded accommodation. An Ottawa Alderman was emphatic, "if something is not done there will be a tragedy. People are sleeping all over the place now. We still have some rooming houses but instead of 1 or 2 people to a room there are 10."

The number of "economic evictions" in the Ottawa area is increasing according to one official. Low income individuals are spending 40-50% of their income on accommodation. This leads to a diminished number of choices for those unable to afford their own separate accommodation. People are often placed in social and living situations which are undesirable and unsuitable. In some cases people may be forced to return to family situations where conditions may be unsuitable or undesirable. Networks and support systems are thus lost and social agency supports may be too distant to seek out. Access to job opportunities and a chosen lifestyle are lost. Women in unacceptable family situations e.g. battered wives, cannot leave home unless they have a place to go.

## 6.4 The group in need

While the housing pressures affect all those with low incomes in our society, the key informants were particularly concerned with communicating the needs of the single person group. This group has no permanent form of housing provided by government assistance and is forced to rely exclusively on the private market or emergency shelter. It is not intended to minimize the needs of groups such as single parent families for whom the pressure is equally great. However, we were asked to focus on a group which has yet to be accepted by society as being a group worthy of some of the special attention and support which is being given, albeit to a limited extent, to groups such as single parent families.

The above position is supported in a report prepared by the Interdepartmental Task Force on Affordable Housing of the City of Toronto dated September 24, 1982.

> "This report concludes that smaller households represent a rapidly growing section of the City's population. Furthermore, unattached individuals have specific housing needs which are not now being satisfied. While many low to moderate income households currently face a housing crisis, this situation is particularly severe for consumers of small rental units. Low income singles and couples under 60, however, are excluded from virtually every type of public housing and rental assistance program." (36)

Many of the key informants have segmented the low-income single person group into a number of sub-groups. Often voluntary agencies have defined one such sub-group as a special focus for their particular agency. The sub-groups include men, women, the skid-row person, ex-psychiatric patients who were recently released from mental hospitals as a result of government policy, ex-convicts, mentally retarded, physically disabled, younger people, etc.

The proportion of young people in need of both long-term permanent housing and temporary shelter has apparently increased dramatically over the past 2 or 3 years among both men and women. This is a sub-group not normally associated with the traditional skid-row population. Yet they are now shoulder-to-shoulder competing for the same shelter and assistance.

The release from mental hospitals of a large number of psychiatric patients into the community has placed still more pressure on a system which was already unable to cope. These relatively newer sub-groups have put considerable pressure on those who have traditionally relied on the dwindling supply of cheap rooms, hotels or hostels for many years.

The more recent arrivals on the scene such as young singles and ex-psychiatric patients have attracted more voluntary assistance. They are seen by some as a group of "deserving poor" rather than the longer-term "non-deserving poor" who are easily identified or labelled as a skid-row problem. Yet it was strongly argued by many of the key informants that the whole group of low-income singles must be seen as being in some way socially disadvantaged and in need of "special" help. The mere fact of having no work, no family network and no permanent shelter is sufficiently damaging to make a person "marginal".

Those who carry an "ex-psychiatric" label are by no means the only group who are in need of special assistance in finding their way to a solid foundation on which to build their lives. Even those who have been in the skid row situation for a long period of time are frequently incorrectly labelled as being alcoholics; it is estimated that only one-third do in fact have a problem with alcohol. Many of these might have been part of the ex-psychiatric sub-group but have instead ended up in another sub-group.

Therefore, it was agreed that there is a real danger in sub-grouping the low income single group and singling some out for special attention. Instead it was made clear that all low income singles are in the same situation. They have two urgent and serious needs in common:

- The need for permanent housing which they can afford.
- The need for some form of support and assistance in order to help them become an integrated part of society.

## 6.5 Emergency housing

In Ottawa the emergency housing system is less sophisticated than in Toronto. The real crisis in Ottawa has emerged over the past two to three years and the emergency housing network has yet to be built up. In Ottawa the process of gentrification is also much more recent than in Toronto where it has been underway for over a decade. In Toronto the emergency system is in place though under extreme pressure, and is being urgently expanded to accommodate anticipated need over the winter months.

The emergency housing system is intended to provide short term housing for people in a period of crisis. While facing their crisis, the emergency housing system helps individuals to meet their shelter needs and provide them with other necessary assistance to get them back on their feet and find a place, and a home, in society again. However, as a result of the drastic shortage of affordable housing, many people are living permanently in emergency hostels.

Some have been there for more than 5 years. Thus the space is not free for "real" emergencies, which occur on a regular basis. Emergency housing is becoming permanent housing and people are becoming permanently dependent on this form of housing.

The emergency system is being expanded to respond to the serious demand for space through the creation of more hostels, flop houses and the opening-up of churches for sleeping at night. While these responses are an improvement over allowing people to freeze on the streets, they are utterly rejected by most key informants. The creation of large scale semi-institutions to resolve the problem of low-income housing affordability is to "sweep the problem under the carpet", "to pretend it doesn't exist" and "to create a state of permanent dependence". The hostel is an important and needed part of the housing system; however, it must not be allowed to become a permanent solution to the housing needs of low income people.

## 6.6 Responses to the problems

Increasingly social agencies, church groups and voluntary groups not directly involved in housing have begun to take action to respond to the problem. As yet the responses are small-scale and experimental and normally limited to one sub-group of externally defined people. Generally the model used points towards a solution which could become widely applicable if funding becomes available. For example, in both Ottawa and Toronto, groups have been formed to assist ex-psychiatric patients.

These ex-psychiatric patients are being housed in groups of about 5 or 10 people in existing houses rented or purchased on the private market, or from cooperatives or municipal non-profit agencies. The rents are within levels affordable by a person on welfare. When a house is purchased special assistance from CMHC has been received. In addition, funding has also been received from the Ministry of Health to provide the social support and supervision which is a vital component of ensuring the long-term success and stability of the accommodation.

The positive elements of the solution are therefore apparent:

- the housing is small scale so as to be unobtrusive within an existing residential community;
- the housing is affordable due to housing assistance from government; and
- funding for sufficient support and supervision is also provided to ensure that the housing is stable internally for the indiviudals and externally for the community.

The same model as described above for ex-psychiatric patients could be applied to all segments of the low-income single person group who need affordable housing. A number of key informants stressed that to provide shelter only is to design a solution for failure. It would likely fail because the residents would not cope individually, with each other, or with the neighbours, without a built-in system of supervision and support. They would confirm all the worst fears of the surrounding community. Cityhome has found increasing costs and problems in the operation of its rooming houses as additional funds cannot be found to provide the necessary level of supervision and support.

Many voluntary and church groups have grown sufficiently concerned about the problems to become directly involved. Groups have offered to manage privately owned rooming houses, to purchase rooming houses, and to be responsible for a special clientele within a designated number of units in a non-profit housing project. Success is usually limited by lack of funding. Their actions are often directed at a very small tightly defined client group. While this is a necessary and important response it only touches the surface. Even where individuals reach a point where they are ready to live on their own without support of an agency they are typically unable to find affordable housing in the market and thus they stay permanently within the limited supply of housing for people like themselves who are in desperate need.

Housing registries which provide assistance to those seeking low-cost rental accommodation and provide landlords with a steady clientele are finding their existence threatened. In Toronto only one out of four such public registries is still in operation. There is simply not sufficient accommodation on the market to keep them busy. Landlords are now also able to turn to private profit-making "room finder" services to find a more affluent tenant. The quality of accommodation which such registries consider to be adequate has dropped since the supply has decreased and the need increased.

The John Howard Society established a room registry service this past summer whereby its summer staff actively sought out accommodation for its criminal justice clients. The project recognized the importance of careful matching of the roomer with the appropriate type of accommodation. This project was quite successful because of the significant amount of staff effort which went into finding rooms and matching these rooms with their clients. Most of the rooms that were found tended to be in rooming houses. In order for a registry service of this kind to be effective on a permanent basis, a substantial operating budget is necessary which ensures a well-staffed organization capable of squeezing all the suitable accommodation possible from the existing housing stock.

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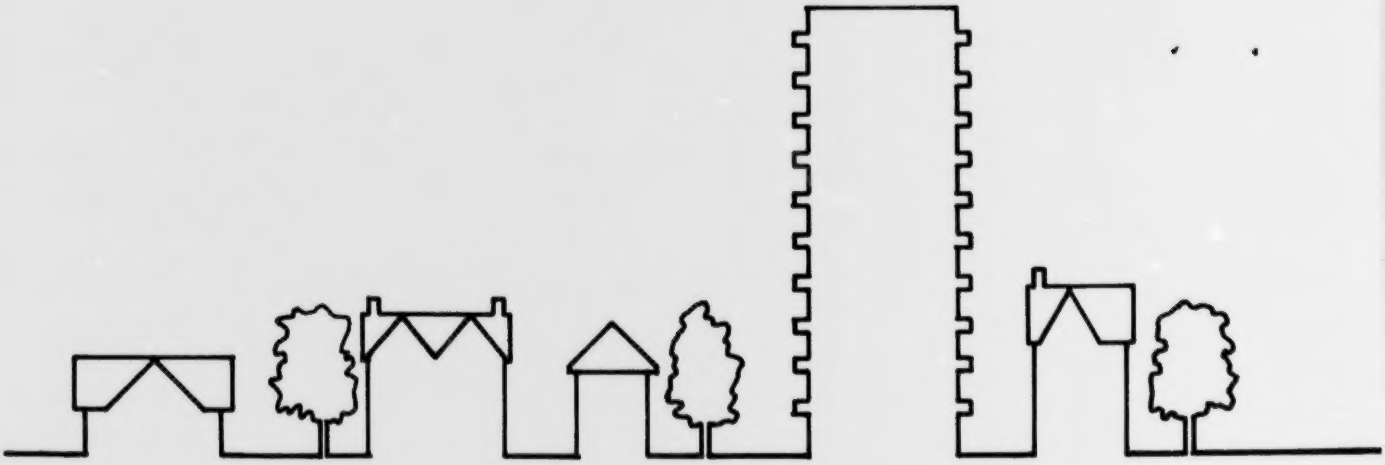

# STUDY OF RESIDENTIAL INTENSIFICATION AND RENTAL HOUSING CONSERVATION

## PART 4 : CONSERVING THE EXISTING RENTAL HOUSING STOCK

## 4.2: FUTURE CONSERVATION REQUIREMENTS AND COSTS FOR HIGH-RISE APARTMENTS AND THE POSSIBLE IMPACT ON RENTS AND TENANTS

PREPARED FOR
THE ONTARIO MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING
AND THE ASSOCIATION OF MUNICIPALITIES OF ONTARIO

BY
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ENVIRONICS RESEARCH GROUP
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MARCH 1983

## VOLUME 10

NOTE:

This is a consultants' report. Any statements or opinions expressed herein are those of the writers or of persons quoted and, unless otherwise noted, are not necessarily endorsed by the Ministry of Municipal Affairs & Housing, Government of Ontario, or the Association of Municipalities of Ontario.

## FOREWORD

This study was commissioned jointly by the Ontario Ministry of Municipal Affairs and Housing and the Association of Municipalities of Ontario. Funding for the study was provided by the Ontario Ministry of Municipal Affairs and Housing through the Housing Renovation and Energy Conservation Unit of the Community Housing Wing. The Ministry's chief representative on the study was Mr. George Przybylowski of the Housing Renovation and Energy Conservation Unit. In this capacity, Mr. Przybylowski was the prime client contact throughout the study process and the consultants wish to express their gratitude to him for his considerable personal committment to this study and the many creative and useful suggestions he made during the course of the investigations.

The findings, conclusions and recommendations contained in the various volumes of the study report are those of the consultants as are any factual errors they may contain. The report does not constitute Ontario Government or A.M.O. policy but is a report to these two organizations for their consideration.

Peter G. McInnis
Study Director

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## GENERAL INTRODUCTION

This document forms one volume of an eleven volume study report commissioned jointly by the Ontario Ministry of Municipal Affairs and Housing and the Association of Municipalities of Ontario (A.M.O.) in July, 1982. The prime objectives of the study were:

1. To examine the opportunities and constraints that exist for meeting some of the future additional housing needs in Ontario during the 1980's and 1990's through the intensification of existing residential neighbourhoods.
2. To examine some of the major forces at work that have and could threaten the conservation of the existing stock of rental housing and the tenants that occupy this stock.

These objectives were formulated in response to concerns on the part of the Ministry and A.M.O. regarding recent and emerging trends in housing and urban development and population growth and change in Ontario.

It is safe to assume that there will continue to be a demand for more rental and ownership housing units in Ontario during the 1980's and 1990's due to both an absolute increase in population and an increase in the number of households. However, there iis growing evidence that this demand could be different in nature than during the last decade. While demand will continue to be focused in urban areas, there will likely be increasing pressure for inner city housing particularly in the larger urban centres such as Toronto, Ottawa and Hamilton. Also, households are getting smaller and older; and more people are beginning to accept the prospect of never being able to afford to own a home. These trends suggest that there will be an increasing demand for smaller dwellings. While consumer preference information may not support this, the general state of the economy and the future affordability of housing may dictate these demands.

The Government of Ontario and the Association of Municipalities of Ontario are concerned about how these additional and somewhat different housing needs of the 80's and 90's will be met, particularly in light of the downturn in the construction of new private rental housing; the economic prospects for the 80's and 90's and the likely restraints on public expenditures related to new facilities and services and socially assisted housing; and the increasing difficulty of providing new housing through large scale redevelopment and/or a further expansion outwards of Ontario's urban fabric.

There are two major approaches to creating additional housing: 1) building new and 2) making more efficient (intensive) use of the housing stock that currently exists. This study is aimed primarily at the latter and specifically at the potential for meeting some of the future housing needs in the Province through the conversion of the existing stock of some 1,200,000 grade-related owner occupied dwellings in the Province. The extent to which this study is concerned with new housing was limited to the opportunities that might exist for small scale residential infill in residential neighbourhoods.

In addition to being concerned about meeting additional housing needs, the Ministry and A.M.O. were concerned about conserving the existing rental stock in a safe and livable condition for at least the same number of households as it currently accommodates. While this aging/conservation issue is by no means a new one, the nature of the issue will likely be quite different in the future. Until the late 1950's, the vast majority of housing in the Province was grade-related and owner occupied, and the conservation of these types of dwellings usually happened as a matter of course without much concern or assistance on the part of governments. In the last 30 years, however, the housing stock profile has changed dramatically with the advent of the high-rise apartment building. Rental apartments in multiple unit buildings form a much larger proportion of the stock than ever before. Approximately two-thirds of the over one million rental housing units in Ontario are located in high-rise or low-rise/walk-up multiple unit apartment buildings. Forty percent or 434,000 of the total rental units are in high-rise buildings. The conservation of the apartment rental stock has never been a serious issue in the past because of the relative newness of this stock. However, as these buildings age during the 80's and 90's (many are already 20 years old), serious attention will have to be given to the efforts that will be required to maintain these units in a safe and livable condition and within the economic reach of a large majority of the population. Therefore, the second objective of this study was in part, to examine the type of building repairs and improvements (and their associated costs) that will be required to conserve the Province's stock of some 434,000 high-rise rental apartments over the next 20 years.

A second rental housing conservation concern of the Ministry and A.M.O. had to do with the perceived loss of low-income rental accommodation that has traditionally been available in the form of rooms and apartments in grade-related dwellings in older neighbourhoods. Specifically, the study was to examine the extent of the loss of this type of housing due to demolition and deconversion resulting from the gentrification of these dwellings and the impact these losses have had on tenants.

The investigations were carried out by a series of five individual consultants working under the direction of a sixth consultant retained to coordinate and direct the study investigations. The work of each consultant was monitored and reviewed by a core study group made up of the five consultants, the study director and representatives of MOMAH and AMO.

Core Study Group

| | |
|---|---|
| Study Director: | Peter McInnis<br>Klein & Sears Research and Planning Limited |
| Consultants: | Michael Adams<br>Environics Research Group |
| | Jack Klein<br>Klein & Sears, Architects |
| | Greg Lampert<br>Clayton Research Associates |
| | Frank Lewinberg<br>Lewinberg Consultants |
| | Peter Milligan<br>Walker, Poole, Milligan |
| Ministry Representatives | Sue Corke<br>Gary McAllister<br>George Przybylowski |
| A.M.O. Representatives: | Mayor W. McLean Town of Ajax |
| | Gwyn Simmons City of Ottawa Non-Profit Housing Corporation |
| Special Assistant To Core Group: | Betty Kaser |

While the consultants' work on this study began formally at the beginning of July, 1982, some considerable effort was spent in advance of this start-up by a steering committee Ministry and AMO representatives in developing terms of reference and a work plan with the study Director that reflected the findings of an extensive and detailed review of the literature pertaining to the issues in question. This literature review was carried out by David Hulchanski for the Ministry during April and May of 1982 and has been published under separate cover. The prime purpose of this review was to identify the extent to which the issues in question had already been considered and the findings and conclusions that had been reached in order that the consultants' work could be focussed on those issues about which there is limited knowledge or understanding. Also, this review provided a valuable basis for establishing certain propositions to be tested in the study.

The investigations, particularly those relating to Objective #1, were carried out on a case study area basis in the municipalities of Toronto, North York, Hamilton, Kingston, Woodstock and Ottawa with special input from municipal officials in Thunder Bay. These municipalities were selected to reflect the fact that many of the issues under investigation were more associated with larger urban areas as well as to provide at the same time, a range of sizes of municipalities for comparative purposes.

The overall study report is organized into 11 separate volumns. These 11 volumes follow the 5 part organization of the findings, conclusions and recommendations of the study investigations as indicated below:

| PART # | TITLE (Prime Consultants) | VOLUME # |
|---|---|---|
| 1 | Summary of Findings And Recommendations<br>(Klein & Sears) | 1 |
| 2 | Economic And Demographic Trends for the 80's and 90's<br>(Clayton Research Associates) | 2 |
| 3 | Residential Intensification And Future Housing Needs | |
| | 3.1 Physical Potential<br>(Clayton Research Associates) | 3 |
| | 3.2 Economic Issues<br>(Klein & Sears and Clayton Research Associates) | 4 |
| | 3.3 The Supply Process<br>(Environics Research Group and Clayton Research Associates) | 5 |
| | 3.4 Tenant Demand<br>(Environics Research Group) | 6 |
| | 3.5 Neighbourhood Impact And Resistance<br>(Environics Research Group and Lewinberg Consultants) | 7 |
| | 3.6 Municipal And Provincial Policies And Regulations<br>(Walker, Poole, Milligan) | 8 |
| 4 | Conserving The Existing Rental Housing Stock | |
| | 4.1 Recent Rental Stock Losses and the Impact of Deconversion<br>(Clayton Research Associates and Lewinberg Consultants) | 9 |

4.2 Future Conservation Requirements And Costs for High-Rise Apartments and the Possible Impact on Rents and Tenants (Klein & Sears and Clayton Research Associates) 10

5 Data Sources And Problems (Clayton Research Associates) 11

This particular volume (Volume #10) of the study report was prepared by two different consultants. Mr. Jack Klein of Klein & Sears, Architects was responsible for the first part of this volume dealing with the future conservation requirements and costs related to high-rise apartment buildings and Mr. Greg Lampert of Clayton Research Associates prepared the second part of this volume dealing with the possible impact of these projected costs on tenants and rents.

## INTRODUCTION TO PART 4

This part of the study is devoted to the second objective of the study outlined in the General Introduction:

> "To examine some of the major forces at work that have and could threaten the conservation of the existing rental housing and the tenants that occupy this stock"

This objective is admittedly broad in scope and complex in terms of the variety of issues that it covers. Therefore, the study was directed to focus on two specific aspects of conservation:

- recent rental stock losses and the impact of deconversion activities; and
- future conservation requirements and costs for high-rise apartments and the possible impact on rents and tenants.

The results of these two areas of investigation are not closely interrelated in the same way as were the various investigations that comprise Part 3 dealing with intensification. Nonetheless, they are conceptually linked in that both deal with the very critical issue of ensuring that rental housing needs of the 80's and 90's can be met.

The existing rental stock in Ontario (as with the total housing stock) is an important and extremely valuable asset which is performing an essential function - housing people who, through necessity or choice, have opted to live in rental accommodation rather than purchase a home of their own. The current rental stock, plus additional new rental dwellings, will be required at least to the end of this century (and likely well beyond also) to accommodate projected household growth as well as current renters. Inevitably, some of this stock will be lost through various means; but each unit lost must be replaced and these replacement units, as well as the new units which are required to accommodate renter household growth, will cost 2 to 3 times as much to build as the units lost to the stock. These higher costs will, of course, be reflected in substantially higher rents for the new accommodation - rents which many of the displaced tenants simply will not be able to afford. This, plus the inefficiency of allowing an essential low-cost capital asset to degenerate or to be demolished and replaced with a high-cost capital asset, is the reason behind this study's mandate to explore ways of promoting the conservation of the existing rental stock.

The reasons behind the loss of rental stock are complex and numerous and they vary in importance from centre to centre:

- Some buildings simply are obsolete and do not provide the standard of accommodation which society dictates as being appropriate.

- Some units are located in structures which have in the past been converted to multiple occupant use which may no longer be considered to be suitable by the current owners.

- Some rental units are individually owned units (grade-related dwellings or condominiums) which can revert back and forth between rental and owner-occupation upon sale or the changing circumstances of the owner. Of particular importance is the impact of what is commonly known as "gentrification" or the deconversion and renovation of existing low rental grade-related accommodation in inner city neighbourhoods.

- In many cases, however, rental units are being lost because the current economics of the rental market are such that many private landlords can make greater returns by disposing of the properties through sale, conversion to condominium or demolition and replacement with new buildings and investing their money elsewhere.

The economics of the rental market are such that prevailing market rents are well below the rents which would be necessary to carry today's construction and financing costs for a new rental property - unless the government is prepared to contribute a significant subsidy. As was outlined in the section on the economic and demographic environment, the reasons behind the problems in the rental market are fairly straightforward - even if the solutions to the problems are difficult:

- Rent review: clearly, the imposition of rent review in 1975, at a time when rental markets were tight and rents were rising, has served to keep market rents below what would have been the case in their absence. It is tempting for many observers to blame the entire rental market imbalance on rent review but this is not the case, other factors have contributed as well.

- Lower subsidies to rental investors: in an effort to spur rental construction in the late 1970's and early 1980's, the federal and provincial governments initiated subsidy programs for investors in rental accommodation. These subsidies were very costly but they resulted in large numbers of new rental projects which had rents well below what would have been possible in the absence of the subsidies. An important impact of these programs from the point of view of the rental market as a whole was that they relieved the pressure for a strong upward movement in rents that would have occurred if the market had been left alone. Most rental subsidy programs have now been discontinued so new rental projects require markedly higher rents than those built even 2-3 years ago with the subsidies.

- High mortgage interest rates: the combination of decreased rental subsidies and the explosion in interest rates in 1979-1982 have dramatically increased the rents which would be necessary to cover costs on a new building or a building facing renewal of its mortgage.

As a result of this combination of factors, new rental units are coming onto the market at significantly higher rents than the units in existing rental projects. New production is weakened because the demand for new units is constrained by the substantial gap between the rents on these new units versus the prevailing rents in the existing stock. Landlords in the existing stock, meanwhile, have had their profits constrained below what they would be in a free market. This can result in either acceptance of the status quo (6% annual rent increases, or more if they can prove that their costs increase by more) or some action which might increase their profits. This latter course could mean one of the following:

- Sale to another landlord can increase profits since, by the rules of the rent review process, the purchaser can pass through an increase in rents as a result of increased financing costs. The ability of the new landlord to pass the higher rents on to the tenant is the key behind this process since the higher rent stream will increase the value of the property - the existing landlord could not pass on such higher financing costs.

- Conversion of multiple unit rental properties to condominium tenure can bring vastly increased values for existing rental properties since the sale prices are more closely related to dwelling replacement costs than are market rents. This avenue has been closed in most municipalities through regulations which place limitations on the ability of owners to convert existing rental properties to condominiums because of the tight rental markets.

- Postponement of normal maintenance or conservation expenses (and minimization of other expenses) can result in higher returns. Landlords can increase rents beyond 6% if they can justify the increase because of increased costs - but increased profits cannot form part of the justification and the procedure is tedious and uncertain. If cost increases can be held below 6 percent, profits will increase - profit-maximizing landlords will, therefore, have good reasons to try to minimize outlays of all kinds. There is a real danger that essential maintenance and conservation expenses on rental buildings are being postponed because of this.

- Demolition and sale or redevelopment can make economic sense in some cases as well. If a rental building is old and substantially depreciated (for tax purposes), and is in a location where a newer residential or commercial building could be successfully marketed at substantially higher rents, it may be worthwhile to demolish the existing building and replace it - even if it is of reasonably good standard. Tax rules can further this process because if a property is substantially depreciated (for tax purposes), sale of the property at a higher price could face the landlord with recaptured depreciation on the building which is taxed at twice the level of capital gains tax on the increased land value. If the building is demolished and replaced, all increased value accrues to the land and the landlord would face no recapture of depreciation. Also, if the new building is in a good location, which much of Ontario's older rental stock is, the site could probably support a quality rental or condominium building with no control on returns.

There are, real concerns that, at a time of tight rental markets in most Ontario centres, much of the existing stock of rental units is at risk because of the types of factors outlined above. Owners of rent controlled units are frustrated because their profits are being suppressed with no real prospect of significant change. Prospective investors in both new and existing rental accommodation are investing elsewhere because immediate returns are better and there are no artifical constraints on future returns. Tenants are frightened because it is difficult to find alternative accommodation at rents they feel they can afford. There is evidence of some deterioration in the upkeep of existing rental properties which, in addition to detracting from their attractiveness and utility as places to live, may be shortening their effective life.

Conserving the existing rental stock is an important issue today. We simply cannot afford to lose the current stock of rental housing when it is clear that both this stock and even more will be required at least to the end of this century. This section attempts to address this issue by examining the extent of rental stock loss in recent years and the social impact of this loss. Also, it examines the costs which we as Ontarians must face to conserve the 434,000 high-rise rental apartment units in the Province over the next 20 years, the types of options open to landlords of today's stock in meeting these costs and the likely impact on tenants of future conservation costs of high-rise rental properties.

## PART 4.2.1

## FUTURE CONSERVATION REQUIREMENTS AND COSTS FOR HIGH RISE RENTAL APARTMENTS

Prepared by:
Klein & Sears, Architects

## 4.2.1 Future Conservation Requirements and Costs for High Rise Rental Apartments

## 1.0 INTRODUCTION

### 1.1 Outline of Report

This report is concerned with the actions which will be necessary, and the costs of these actions, to conserve the existing stock of high-rise housing in Ontario. It is organized as follows:

- "Conservation" as it is used for the purposes of this study is defined in section 1.3.
- Section 2.0 comments on the principal causes of building deterioration.
- Section 3.0 summarizes the overall findings with respect to the extent of building deterioration.
- Section 4.0 describes the main conservation requirements with some illustrative comments on costs.
- Section 5.0 deals comprehensively with costs for conservation through the development of costs for a hypothetical building and five specific building case studies.
- Appendix A includes the basic data gathered on conservation issues and costs in the form of cost analysis issue sheets.
- Appendix B provides some additional comments and cost analysis issue sheets on conservation and maintenance items not directly related to habitability.
- Appendix C contains explanatory notes for the development of costs for the hypothetical building.

### 1.2 Study Method and Acknowledgements

Although the initial objective was to review high-rise housing throughout the Province, it became apparent very quickly in the investigations that the problems and issues related to conservation and the factors affecting costs of intervention are not affected by locational considerations. While the review does deal with specific case studies, these are building specific and do not necessarily relate to the case study areas which other sections of the overall report address.

The information presented in this report was generated in several ways:

- Interviews were held with representatives of both public and private sector landlords regarding their experience in identifying problems and taking action to conserve the housing they own and operate. In all cases, these individuals were senior members of the operations and management divisions of these companies.

- In addition to the architectural experience of Klein & Sears, firms of consulting structural, mechanical and electrical engineers, and a landscape architect were available to assist in the study. These consultants developed overview papers drawn from their personal experiences with correcting problems related to conservation. A cost consultant was employed to assist in cost analysis.

  List of sub-consultants:

  Jablonsky Associates - Structural
  M.V. Shore Associates Ltd. - Mechanical/Electrical
  Hanscomb Consultants Inc. - Costing
  John D. Consolati - Landscaping/Site Development

- A large variety of individual issues (see Appendix A) were identified as having a direct relationship to building conservation. These issues were individually analyzed and costed, and their frequency of occurance noted were appropriate. All specialist consultants were involved both in the identification, analysis and costing of the individual conservation issues. These issues were subsequently clustered into the major overall categories outlined in the next section.

- An initial review was carried out of available literature, but it was found that the limited information available deals only with broad generalizations with no direct application to this report. There is, however, a considerable body of unpublished information in the hands of the development industry, drawn from the experience of companies who own and manage large numbers of housing units. Some of this unpublished information was made available for the study.

- Observational analysis was carried out on a random sampling of existing buildings.

- Five specific case study buildings were analyzed.

- Many individuals generously contributed time and information to this section of the study. We would like to recognize the special contributions of:

  Bill Heart - Ontario Housing Corporation

  Don Clark
  John James - Cadillac Fairview Corporation

  Jay Roth - Meridian Building Group

  Gerry Weiman
  Lou Coulter - Greenwin Property Management

## 1.3 Conservation Explained

The analysis of conservation requirements and costs addresses itself primarily to long term measures needed to preserve the life of a building. However, it is not always possible or realistic to completely separate issues of maintenance or shorter term measures from those of conservation. The following discussion comments on the relationship between conservation and maintenance and defines the way in which issues of conservation are identified for the purpose of projecting costs.

All buildings require maintenance to retain them in stable condition whereby they can be used daily. A building simply cannot be left without attention to a myriad of individual items. These include many so called cosmetic treatments such as cleaning, decorating, and cutting grass. These cosmetic actions are necessary to preserve the surface quality of the building - its appearance. A building management process which permits deterioration of the building appearance will likely be found to permit deterioration of less visible elements. Even in a high demand rental market, buildings which are not clean, which have corridors in need of repainting or which have weed strewn lawns will likely find consumer resistance.

In addition to cosmetic maintenance needs, all buildings require maintenance to parts of the building fabric and equipment. Such maintenance can involve regular service to the heating system, the elevators, safety systems and less apparent items like repairs to caulking and attention to roof flashings.

These are all activities necessary to counter the affects of age and use of the building. Every building, large or small requires such attention. The manager of a large building must carry out, at a vastly larger scale, the same activities any homeowner performs in looking after an individual residence. Just as furnace filters must be changed on a regular basis in the private dwelling, so must the manager of a large building arrange to regularly maintain the heating plant of the building. In most cases, these regular activities are identified as necessary and carried out in a responsible manner by the managers and operators of apartment buildings.

Buildings constructed using faulty workmanship, poor materials, or bad design will require greater interventions in maintenance procedures than will buildings more carefully constructed of higher quality materials. In both cases, however, lack of maintenance will contribute to unnecessary repairs, often costly ones.

The process of conservation, while inextricably related to maintenance, has a different meaning and thrust. Conservation implies preservation over an identified period of time, such that the building can be safely used and enjoyed over its expected life span. This implies that measures must be taken to prevent the premature decay or loss of the building or its parts. As with maintenance, all buildings require conservation measures to prevent their premature loss through neglect. By way of explanation, a dirty wall may be unsightly but will not directly contribute to decay. The dirty wall is a maintenance item. A leaking roof may create unsightly conditions but will most probably also contribute to the accelerated decay of the very fabric of the building. A leaky roof will be a conservation as well as a maintenance item. In some discussions, conservation is referred to as preventative maintenance.

The process of conservation in buildings is further regarded as including the activities which may be carried out to upgrade parts of a building to meet the standards of by-laws and codes which may not have existed when the building was constructed; or to introduce elements in the building which would reflect current operation objectives such as insulation or double glazing to reduce energy consumption.

Just as for maintenance, conservation actions are largely governed by the initial adequacy of construction. Poorly constructed buildings are more difficult and costly to conserve than are well constructed buildings. In this regard, the issue of life costing is discussed below.

The dimension of conservation actions which may be necessary over the next twenty years are extremely difficult to measure. A small building owned and operated by a so called 'mom and pop' business will bring a totally different attitude and approach to the subject than will a large corporation owning a hundred or thousands of dwellings. There are also differences in attitudes and procedures between the public and private sectors.

The types of conservation issues analyzed and costed in detail as a part of this study include:

| | Examples |
|---|---|
| 1. Weather Protection: | Water penetration through roofs and walls, flashing failures, caulking, disintegrating wall cladding, window leakage, double glazing. |
| 2. Structural Integrity: | Shelf angle failure, missing expansion joints, balcony disintegration. |
| 3. Building Systems: | Boiler failure, inadequate electrical supply, galvanized pipe replacement, ventilation controls, boiler upgrading, conversion to fluorescent lighting. |
| 4. Parking Structures: | Slab disintegration, missing waterproof membranes, inadequate drainage, leaking subgrade walls. |
| 5. Occupant Safety: | Firemens' elevators, emergency power, smoke detectors, upgrade fire alarm system. |

6. Movement Systems: Elevator vandalism, high maintenance costs.

7. Equipment and Fitments: Countertop replacement, cupboard replacement, retiling bathrooms.

In addition to the major areas of conservation requirements identified above, a number of other areas of concern were raised during the investigations. These include energy conservation, appearance and aesthetics, site development and amenity package. While issues relating to these areas can sometimes be very costly, they have not been included in the costing of conservation requirements because they don't have a direct relationship to habitability. Information with respect to these areas of concern is included in Appendix B.

## 2.0 PRINCIPAL CAUSES OF BUILDING DETERIORATION

After even the briefest review of the characteristics of existing residential buildings, it is readily apparent that the ongoing requirements for conservation of the existing rental housing stock are vast. While it is always difficult to generalize on so large a subject, there are certain broad statements which can be made.

> The principal reason there are major costs for both maintaining and conserving the existing rental housing stock is the inadequacy of the initial design and construction.

Buildings which are initially well constructed using appropriate materials, arranged and connected together according to best practice and using good quality of workmanship, generally have lower conservation needs than do poorly constructed buildings. This point is of such fundamental importance and is so frequently encountered that special note is made of it. It applies to all aspects of construction. It includes the adequacy of the particular materials or equipment selected as well as the manner in which the various components are arranged in relation one to another. Good quality construction also requires that the architects, engineers and the contractors be familiar with current best practise. The construction industry through its various associations is constantly reviewing and upgrading its knowledge of materials and the performance of these materials in the construction systems. The National Research Council through the Division of Building Research provides what is possibly the best information base to improve the quality of building construction. However, little of this information reaches the ordinary workman and mechanic actually engaged in the construction process.

In addition, it should be noted that the financial approval process actually encourages low initial capital cost at the expense of future maintenance and conservation costs. Life costing examines the owning/operating costs for a building over a specified period of time. The simple objective of the process is to quantify capital cost against total life owning costs to assist in making initial decisions about the quality of construction that will result in the lowest total life owning and operating costs.

Life costs are made up of at least three and sometimes four elements:

- Creation cost - land construction, design, equipment, etc.
- Operation and maintenance - repairs, utility and fuel costs, etc.
- Cyclical renewal - conservation, major replacement, etc.
- Occupancy costs - cost of specialized facilities. (In residential buildings, parking garages, swimming pools, etc. would be considered occupancy costs).

For building owners who will operate and manage rental residential buildings over long periods of time, the long term owning costs should be of significance. In this respect, there are numerous examples where buildings have fallen short and burdened the owner with inordinately high owning costs.

In the majority of cases, the industry is not concerned with life costing. The industry is largely governed by the procedures of mortgage lenders and assessors; low capital costs rather than low life-cycle costs are the objective. This very basic financial process controls the way in which buildings are constructed and encourages the production of buildings which are cheap to build, but which will be costly to operate, maintain, and conserve.

> Just as initial design may have been inadequate, the inspection and review process which may be applied to a building under construction is also not adequate.

Too often the official inspectors representing the lenders or the municipality do not have either the time or the knowledge to adequately inspect the work being constructed. The specialist skills of a foreman-carpenter are not adequate to review the construction of a large complex residential building. When an inspector with narrow skills can only visit the site every week or two, the possibility exists that the work may not meet the code requirements or the basics of good construction. The inspection of the work by the architects, sufficient to meet the 'field review' requirements of the OBC, are not sufficient to ensure the performance of the contractors actually doing the building.

> In almost all cases the persons with the responsibility for maintaining and conserving the existing rental housing stock are not the same persons who were involved in construction of the housing.

The persons charged with maintenance are often administrators rather than construction professionals. The administrators are often guided by short term operating costs and a lack of sufficient knowledge of building technology. This can result in decisions which are cost effective in the short term but which can result in serious long term building problems.

> The skills of the day-to-day building maintenance personel are often inadequate to maintain a complex building with its many specialized pieces of equipment and systems.

Very often, the person in charge of individual building maintenance is someone who has no special skills in building maintenance. The person may have entered this area of employment simply because this was a work opportunity. At best, the person so employed will have a specialist skill in one aspect of buildings. The generalist skills of the ordinary person directly engaged with the maintenance of an individual building are usually not sufficient to grasp the problems which can exist nor to adequately present a correct solution to the problem to a building manager who may be primarily an administrator.

The rent review process has an effect on the attitude which building owners take to major maintenance or conservation needs.

In discussions with the private sector, the most common reason given for restraint in building conservation was the effect of rent review. While it seems clear that many items of capital cost which are related to conservation measures meet the guidelines for rent review, the process is one which does not encourage owners to make application. Many factors are given for this, including:

- general resistance of tenants to support increases in rents for conservation actions which they can not readily perceive or which may not benefit them during their relatively short residence time
- difficulties of the application process itself
- the need to make repeated yearly applications for actions as their need becomes apparent or due
- public relations
- the feeling that the landlord will lose no matter what.

This results in only a selected group of actions being taken by the landlord:

First: Actions are directed towards short term repairs rather than preventive conservation measures which will prolong the life of the building or its equipment.

Second: Cosmetic actions take priority over preventative actions.

Third: Only those conservation actions which can produce a direct dollar 'pay-back' are undertaken. Certain energy saving actions in heating systems meet this objective.

At this time, there is no visible evidence that rent review is affecting the immediate useful life of the residential rental stock or contributing to immediate concerns with public safety. It is suggested, however, that the 'patch-up' approach will contribute to major problems in the future which may be solved by landlords only at a time when rent review is eliminated or modified.

## 3.0 OVERALL COMMENTS ON EXTENT OF BUILDING DETERIORATION

- Maintaining existing buildings in a weathertight condition remains a major problem and one which will require large capital costs. Roofs, walls, and windows are all problem areas. Older buildings are often in better condition than newer ones in this regard. As a general rule, low buildings are usually less of a problem, but there are exceptions. The industry generally has been slow to take up protected membrane roofs which have demonstrated excellent long term qualities, and the poor application of wall insulation, which when it is used, is generally installed on the inside surface of exterior walls, will also contribute to long term wall problems which will be costly to correct. Poor window design and poor aplication of window design principals will contribute to long term costs. Even some new window installations in tall buildings cannot adequately resist the storm forces they are subjected to. Unfortunately, many small buildings which have been retrofitted with increased thermal insulation in wood framed roofs have not followed good practice in the provision of air/vapour barriers or the ventilation of the roof spaces. These will present problems in the future which are serious and costly to correct.

- A dangerous element is the deterioration of exterior masonry walls. Falling brick or even pieces of brick can be a hazard to human life.

- With the exception of parking garage structures, the essential structural elements of most buildings, those elements which hold up the building, are in sound condition regardless of age and only minimum actions are required to either maintain or conserve these structural parts of buildings. The exceptions to this generalization are principally in above and below ground parking structures, some problems with balcony slabs which are supported on open web steel joist extensions, and some problems with balcony railings. The problems with parking garage structures are however, the most significant.

- A most dangerous element is the deterioration which is happening to suspended garage slabs. If left, these can be a hazard to human life.

- The need to upgrade fire safety systems in buildings will largely be governed by codes. Many older buildings fall significantly short of meeting the fire code safety requirements applicable to new buildings. Continual upgrading and testing of fire safety equipment is an ongoing maintenance problem. It can be dangerous if fire safety systems are neglected.

- Generally, the public sector has taken the lead in upgrading the fire safety aspects of buildings. The private sector does follow the requirements of the safety codes but is constrained in upgrading older buildings built under less stringent codes. The constraints of rent review are most commonly cited as the reason for this.

- While elevator maintenance costs are a sigificant ongoing maintenance cost, except for the extraordinary abuses of vandalism, elevator systems are well maintained and will likely serve both old and new buildings for many years. Upgrading elevators in older buildings to meet current fire codes is a major cost that has not been undertaken by the private sector.

- Few interventions are apparent in matters of energy conservation. Some operations carefully monitor energy costs, however the large scale actions which might result in reduced energy consumption and lower energy cost are not being done. The reasons for this are largely economic and include: no perceived pay-back for double glazing windows, and no perceived pay-back for increasing wall insulation. It is common for roof insulation to be increased when the opportunity is available. Less perceived but effective interventions are being instituted through constant upgrading works being carried out in mechanical systems both for heating and domestic hot water.

- The most effective aspects of maintenance are to be found in the cosmetics of the buildings. Generally buildings are clean and reasonably fresh looking, with the public areas particularly tidy, both indoors and out. Painting is kept up and outdoor landscaping well maintained.

- Large projects which include extensive amenity facilities are a serious and ongoing maintenance burden. These facilities are commonly underused while the operation costs never stop.

## 4.0 MAIN CONSERVATION REQUIREMENTS

The following discussion of the main conservation requirements includes in some instances, costs for the issues discussed. It should be noted that these costs are not always directly related to the cost analysis issue sheets (Appendix A) as they sometimes represent an aggregate of several individual items or they may take into account costs over a period of time rather than one time costs.

### 4.1 Weather Protection

Keeping buildings weathertight is a major occupation of property managers and is an area which requires and will continue to require large amounts of money and effort for conservation purposes. Three principal parts of buildings are involved:

- roofs
- walls
- windows

As different as these parts of buildings are, similar principles are applied to the correct design and construction or repair of all the parts. These include:

- control of heat through the correct application of insulation
- control of air movement through the correct application of air barriers
- control of water

Where building parts fail in terms of weather protection, the reasons can be found in a failure of one or more of the above. The failures are manifested as roof leaks in flat roof buildings, water penetration through masonry walls (particularly east weather walls), and water leaks and excessive drafts through windows. Almost all high-rise apartment buildings of any age experience problems in some or all of these areas.

Initial correct design of the building elements is of fundamental importance. Good workmanship during construction is of equal importance. Similar care is required in carrying out conservation measures. Unchecked water pentration can have disasterous effects on internal living environments as well as contributing to the deterioration of structures and excessive heat loss.

Internal environments contain surfaces and materials which suffer permanent damage when exposed to water (e.g. wood parquet flooring and plaster wall surfaces). Water penetration into wall structures effects most forms of insulation and can start rapid deterioration processes. Freeze thawing can result in threat to human life, through deterioration of exterior brick and parapets which can break off and fall. Electrical hazards exist when water contacts wiring and outlets.

Conservation of roofs is a basic element and a costly one in the preservation of a watertight building. Traditional built-up roofing, properly designed, which places the roof insulation below the roof membrane can provide years of trouble free service, if the workmanship is first class throughout. Anything less than perfect design and workmanship can result in a roof which will be trouble prone from the first year it is installed. Abuse of this type of roof from workmen working over the membrane while they are engaged on other parts of the building work also contribute to failure. Roof leaks occur primarily at intersections of roof with parapets, penthouses, roof mounted mechanical equipment, and with penetrations in the roofing with vents, stacks.

Since about 1970, protected membrane roof systems have begun to be used with increasing frequency and success. This roof type has proven to be more trouble free, and less prone to the ordinary failures found in roofs with the insulation below the roof membrane. Correct detailing and good workmanship are as necessary in a protected membrane roof as in a traditional roof, however the protected membrane roof is more tolerant of less than perfect installation and much more tolerant of subsequent working over. Many property managers are now retrofitting protected membrane roofs as traditional roofs age or deteriorate to the point of requiring major replacement. The constraint to using a protected membrane roof in retrofitting with increased insulation is the limiting ability of a flat roof structure to carry the extra weight of stone ballast which is required. Depending on the ability of the roof structure to carry the additional stone ballast which may be required, a retrofitted protected membrane roof can have increased roof insulation applied to effectively contribute to energy savings. Most reinforced concrete roof structures can carry this additional load. It is rare to find roofs constructed of either wood or steel joists that are of adequate strength to support the required additional stone ballast.

The maintenance of roof flashings and caulkings is often neglected. While, good practice in design and installation is of initial fundamental importance, these building elements require careful and thoughtful maintenance which if neglected can contribute to large and expensive repairs.

It is difficult to find conventional flat roofs lasting more than 10 years without requiring major repairs or total replacement. Although protected membrane roofs are gaining in popularity, the vast majority of flat roofing is still traditionally built-up roofing with insulation below the membrane. At present day cost, it is estimated that the replacement cost of a roof every 10 to 15 years is on average $320. per dwelling unit. Assuming 50% of all roofs require major replacement immediately, then 100% will require replacement once in the next 20 years. As well, all roofs require yearly maintenance which costs an average $16. per dwelling unit per year. Roof repairs for an average building of 120 units could cost approximately $320. x 120 units + $16. x 120 units x 20 years = $96,000. in 1982 dollars over twenty years.

Weather protection requirements for exterior walls is a substantial and often poorly understood area of building design and construction. The issues have been complicated by recent concerns with energy conservation which encourage application of insulation to exterior walls. Such insulation applied to the interior of double wythe masonry walls can create moisture problems or at least contribute to the problem[1]. Exterior walls which leak are significant problems and can only be solved with major interventions. Many forms of minor corrective maintenance have been tried; few work.

The costs of these repair measures can be as much as $560. per unit every 4 to 6 years. Over 20 years, a 120 unit apartment building may cost as much as $336,600. This does not include repairs to inside finishes which may be affected by wall leaks.

Intrinsically the problem is one of poor design and workmanship. If the wall could be constructed perfectly, without any openings through which water could enter, the wall would not leak. It is rare to find such quality of workmanship applied. Even a perfectly constructed wall is subjected to a variety of forces which create conditions for water to enter. Elastic deflection and concrete creep are forces which can affect the integrity of the wall and can directly contribute to wall leaking and indeed wall deterioration (see Section 4.2 Structural Integrity).

Various interventions have been tried, some more successful than others. At one time, various types of exterior wall coatings were applied to "waterproof" the wall. These treatments were generally unsuccessful. Some better results have been obtained by carrying out major repairs to joints in masonry work including tape grouting, raking out and repointing joints, providing drainage holes in the wall, and so on. Some of these solutions may provide good results for at least a short period of time, but permanent correction which can be counted on requires greater intervention. This can include removal of and complete reconstruction of parts of the walls which leak, or cladding over the exterior of the wall with a new wall skin which incorporates air seal, insulation, and new exterior skin elements. Depending on the exterior exposed area of the dwelling unit, the cost for this work will vary. These costs are major ones and can be as high as $2,300.00 per dwelling unit for the affected building.

Windows

Leaking windows are a somewhat simpler problem and the process for correcting them, while costly, is in most cases, relatively easy. Single glazed steel casement windows were widely used in residential buildings until about 10 years ago. They were inexpensive, attractive, and if properly installed and adjusted they performed reasonably well for low buildings. These windows could easily be pushed out of perfect adjustment by wind forces acting on a partially open sash or by forcing the window when it was being opened or closed. In high rise buildings, this window type, as well as many other single glazed window types, were unable to resist the forces which act on tall buildings during rain storms combined with high winds.

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[1] Canadian Building Digest No. 175, March, 1976

Single glazed windows which leak water and wind should be provided with storm windows, preferably mounted on the exterior. Where the use of casement windows does not permit the exterior mounting of storm windows, it may be necessary to remove the existing sash and completely refit new prime and storm windows. Mounting storm windows on the interior is not recommended except in very low buildings of no more than three floors. Properly designed and installed, storm windows will in almost all cases effectively stop both water and air leakage at the window while at the same time contributing to energy savings.

Retrofitting a 120 unit building with storm windows could cost $650. per suite or $78,000. overall depending on the amount and type of glazing. Although the pay-back is considered inadequate, some property owners are replacing single glazed windows with double glazing at a rate of 7% per year. The retrofitting of a 120 unit building with thermally resistive windows could cost $2,500. per suite or $300,000. over all.

## 4.2 Structural Integrity

When structures are properly constructed in compliance with the governing codes and standard terms of reference, and they are adequately protected from weather and chemical attack, there are generally few problems with structural integrity. Problems tend to arise from poor workmanship and a lack of proper execution of details primarily at expansion and construction joints. Except for superficial items of minor repair, very few structural deficiences were reported or observed in principal structural members except as noted in 4.4 Parking Structures.

Concrete frame buildings generally have an inherent resilience as a result of the nature of the material and the redundancies in the overall system. Masonry bearing wall buildings whether they are framed with wood or steel joists or precast concrete planks tend to be more brittle in nature and do not respond to lateral forces very well, particularly in more severe seismic regions.

The problems of integrity appear to manifest themselves more in areas of architectural and structural interaction details, such as the anchorage and jointing of cladding and partitions, particularly at expansion joints and at locations where long term deflection and creep require special attention. The architectural details must be treated in a manner which recognizes the long term structural behaviour of the framing elements. This is commonly not carefully done and is a problem particularly for exterior wall systems constructed of masonry. Where structural elements are protected from weathering problems which include such items as wetting, freeze-thaw cycling, and sudden thermal strains, the structures generally perform in a satisfactory manner. At the same time structural elements should be protected from attack by such common chemicals as road salt which when it goes into solution can have disasterous effects both on steel and concrete.

The lack of construction control joints is symptomatic of buildings prior to 1970. It is estimated that 80%-90% of high rise buildings built before 1970 have either inadequate horizontal or vertical control joints or they are non-existent. Repairs for this work are expensive but when correctly done, need only be done once. In a 120 unit building horizontal control joints would cost approximately $69,600. and vertical control joints would cost approximately $19,840. These costs are modest compared to the costs of repairs required if cracking is left exposed to the elements.

Beyond the initial protections, there are such details as caulked joints and the like which require cyclic maintenance to keep them performing effectively in providing adequate weather protection. Where this is done and the building is well detailed there is generally little in the way of problems with structural integrity.

### 4.3 Building Systems

The conservation actions for building systems tend to fit into the category of major costs. Continuous maintenance of these systems consumes large amounts of time and effort on the part of building operators and can represent a very large part of a maintenance/conservation budget. The larger items are examined under four headings:

- Electrical
- Heating
- Plumbing
- Ventilation

#### Electrical

Conservation requirements of electrical systems centre around several major issues: changes in electrical code, increased user needs, and the use of aluminum wiring in some buildings.

Electrical services and lighting systems need upgrading to meet current code requirements and to accommodate the increase of home portable appliances, including window air conditioners which have become prevalant over the last 10 years.

Main electrical service and branch feeder risers in older buildings constructed prior to 1970, are becoming overloaded. Continuous overloading and improper maintenance will lead to burnout of equipment and create fire hazards.

Buildings constructed prior to 1977 are not equipped with ground fault protection on the main service entrance switch. This requirement became mandatory by 1977 in the revision of the Canadian Electrical Code for switches with ratings of 1000 ampere and larger for system voltage phase to phase of less than 750V and phase to ground of more than 150V, and switches of 2000 ampere and larger with phase to ground of 150V or less.

Aluminium conductors became widely used during the period of copper shortage from 1965 to 1975. Improper termination methods have caused many failures and frequently have resulted in electrical fires in the main switchboard and panelboard. Replacement of aluminum conductors by copper conductors is necessary where proper termination methods are impractical to achieve.

Replacing aluminum conductors with copper can cost approximately $2,200. per suite. Given that aluminum wiring was installed in many buildings between 1965 and 1975, replacement of aluminum conductors will likely constitute a major conservation cost in the future.

## Heating

Maintenance in hot water heated buildings relates largely to boilers, fuels, and controls. Those buildings using steel fire tube boilers will require complete replacement as repair costs escalate. Other types of equipment can continue to be maintained at a reasonable cost, but changes may be desirable for energy conservation.

Steel fire tube boilers, even with regular maintenance, require replacement on an average of once every 20 years, at a cost of approximately $80,000. per boiler. Isolating valves generally require replacement once every 10 years, at a cost of approximately $180. per suite.

Approximately 75% of all smaller buildings (less than 100 suites) and 25% of all larger buildings are electrically heated. Electrically heated buildings generally enjoy low maintenance costs with greater fuel costs. The trade off is usually good with the exception of some badly constructed buildings with poor thermal resistance which have exhibited exhorbitant fuel costs.

Generally, the electric hot water heaters in older buildings need upgrading. Electric hot water tanks and heaters usually involve major costs for both regular maintenance and repair.

With the present day concern for energy conservation, most heating controls need upgrading for energy conservation. Individual non-limited thermostats should be replaced with controlled thermostats, limiting heat and energy consumption. Overall, building heating controls in older buildings are being modified and upgraded over time. Due to the rapid development in this area, it is difficult to estimate a 20 year cost. A control applied to an existing hydronic system boiler can cost between $2,000. and $4,000. with annual maintenance and adjustment costs of approximately $600. - $1000. These costs do not appear in the hypothetical building case study as they are not considered conservation measures for the purpose of this study.

## Plumbing

Some older buildings will require extensive replacement of galvanized piping, plumbing brass (taps) and isolating valves. If this is not carried out, the quality and flow of water deteriorates to an unacceptable level.

Most building managers have long range programs in place to refit all galvanized water piping with copper. This is commonly done in two stages: first the replacement of risers, followed by the replacement of branch lines. This is a massive project since it requires opening up of existing walls and subsequent wall repair. Local isolation valves at plumbing fixtures (in older buildings where such valves were not installed) are fitted at this time.

Plumbing brass, using common washer type compression stops, require frequent maintenance for washer replacement. As these fittings age, they are increasingly being replaced with washerless types. While this in itself is a small cost, each dwelling unit will have at least three such fittings; multiplied by a large number of units, the extended costs can be very large.

Some building management operations incorporate a continuous program to upgrade buildings by the installation of domestic hot and cold water isolating valves. Such valves are necessary to section off parts of the building so repairs can be carried out without closing down the entire building. In very large buildings, the maintenance of these valves is a separate operation.

Assuming complete replacement is necessary, the cost of such a program can be broken down as follows:

| | |
|---|---|
| Galvanized piping replacement: | $ 450. per suite |
| Isolating Valves for Hot & Cold Domestic Water | 170. per suite |
| Plumbing Brass Replacement | 360. per suite |
| Total Cost Per Suite: | $980. per suite |

A 120 unit building would cost approximately $117,600 to overhaul the complete domestic plumbing system.

## Ventilation

Ventilation in older buildings is generally poor. It usually is not effective in controlling cooking smells and is usually energy inefficient.

Each building requires specific analysis, but included in conservation actions are the following:

| | |
|---|---|
| . replacement of worn out equipment | $10,000. per building |
| . corridor maintenance | $24,000. per suite |
| . timers and volume controls on make-up corridor air system | $2,000. per mechanical unit (usually 2) |
| . timers and volume controls on central kitchen and bathroom exhaust - up-grade all equipment | $9,000. per suite |

Costs for overhauling the ventilation equipment of a 120 unit apartment would be about $45,000.

### 4.4 Parking Structures

Parking structures are one of the principal and major areas which require extensive and costly conservation actions. The list of problem areas is lengthy and applies to garages of all ages. The actual problems are apparent in relatively new structures, some only 2 or 3 years old, as well as in most older buildings. The problems exist in the following areas:

- deterioration of suspended slabs
- expansion joints
- roof slabs
- lighting
- sprinklers
- entrance ramps

Each of these problem areas is discussed in some detail since the problems are both extensive, frequent, and costly.

There are problems with exterior surface parking areas as well as garages. These are discussed in Appendix B.

#### Deterioration of Suspended Slabs

In the past, suspended slabs in residential building garages were not provided with any protective sealers, coatings or membranes. This fact together with the use of salts on city streets and highways has combined to create a set of conditions which leads to the deterioration of reinforced concrete slabs. If garage floors are sufficiently drained and regularly flushed with clean water during the winter, it is probable that little damage would be done. However, garage floors are generally poorly drained (they tend to be installed too flat) and are rarely swept, let alone flushed with sufficient clean water, to remove salt before it can enter into the concrete slab and lead to deterioration. Concrete which does not contain an air entraining agent is even more susceptible to this deterioration since it permits the salt laden water to penetrate readily causing a rapid corrosion of the reinforcing bars in the concrete slab. As the corrosion products accumulate on the perimeter of the reinforcing rods, they make the cross-section of the rods increase which results in disruptive splitting forces developing around the reinforcing rods. The splitting results in cracks developing on the surface of the slab, (generally above the bars) and in some instances, particularly if the concrete cover is thin, the cracking can cause delamination and/or spalling of the top surface of the slabs above the bars. This effectively impairs driving.

If cracks develop in the slabs and water gets down to the bottom, similar action can take place at the bottom bars causing delamination and spalling at the soffit of the slab. The soffit deterioration is often limited compared to the top surface deterioration where the aggressive action of the salt is more concentrated. In addition to the spalling at the surfaces and cracking at the soffit, there is often surface crazing, pitting and a general breakup of the surface, due to the abrasive action of the traffic in conjunction with the chemical attack of the salt ladden water. If left unattended this deterioration can eventually lead to slab collapse. Most garage slabs of this type are presently in need of repairs which involve the removal and replacement of deteriorated concrete along with local reinforcement replacement and the imposition of a membrane and traffic bearing surfacing over the repaired slab.

The repairs involved cost on an average of approximately $150. per car and protective topping membrane costs $600. per car.

## Garage Expansion Joints

Expansion joints in parking garages have, in the past, caused a disproportionate number of problems. Initially the problems begin as water leaks which if left unattended, can develop into major structural problems. Waterproofing details have in the past been poorly executed and expansion bearings were not generally employed to permit free movement when the slab on one side of the joint was brought to bear on a continuous ledge at the other side of the joint. Often the width of the ledge is not well controlled. Designs have evolved providing bond breaking sheets of various materials, from waxed paper to plastics, nylon pads and most recently expansion bearings, to ensure free movement at the ledge. The width of ledges have increased to deal with the movements and the bearing stresses on short cantilevered ledges. Much of this problem could be reduced if a double line of columns could be accommodated but this is often not architecturally possible. In some garages the joint has not been provided in the walls as well as in the slabs, and as a result, the wall has developed vertical cracks approximately at the line of the joint in the slab.

Where garage slabs are provided with an expansion joint at the interface with the main building of a multi-storey concrete frame, there are additional movements which are brought into play as a result of lateral forces on the multi-storey frame. This, together with foundation planting and subgrade watering systems, can often make this joint even more susceptible to leaks. In roof slabs, the water can at times be subject to freeze-thaw action and on parking levels the water is contaminated with salt. In both cases the water entering micro-cracks in the ledges can cause actions to occur which tend to break up and in time destroy the haunch or ledge. Unchecked deterioration can lead to an excessive water problem, and the possibility of a slab collapse.

The problem tends to be cyclical. Even if the problem is corrected by the ordinary patch methods commonly used in this area of building maintenance, the problem tends to re-occur. There is no simple solution to this. Each particular condition requires individual analysis and treatment, which is usually extensive and costly. For example, the cost of repairing a 100 foot expansion joint would be approximately $20,000.

## Garage Roof Slabs

Roof leaks in underground parking garages are a significant contributor to high conservation costs. The reason for roof leaks is fundamentally poor initial quality of construction. Poor construction can be found in several areas including: occasional complete omission of a roof membrane, inadequate roof membrane, roof membrane imperfectly protected from granular drainage material located between the roof membrane and the planting or paving medium over, inadequate or no provision for expansion, imperfect waterproofing of light standards on a garage roof, improper installation of plant boxes over a garage roof, improper installation of traffic decks for pedestrians or vehicles over garage roofs and overloading the deck.

These roofs have generally been designed to carry the weight of the prescribed soil fill over plus one hundred pounds per square foot live loading in general landscaped areas. Where driveways occur, the roofs have been designed to carry the weight of the specified paving sandwich plus two hundred and fifty pounds per square foot live loading. Prior to 1963, the method of design was not as refined and the slabs could often tolerate a greater degree of overload. However, with the introduction of ultimate strength design methods the reserve capacities in the slabs were optimized and the limits to overloading became more restrictive.

A significant contributor to garage roof failure is overloading the roof slab with more landscaping material than it was designed to carry. This can occur insidiously over time and can be caused by overenthusiastic grounds maintenance personel who are not familiar with the load constraints. In their enthusiasm for improving the landscape, large trees can be added which require a depth of earth which the garage roof slabs were never designed to carry. While structural collapse is rare, such a collapse did recently occur in Toronto for this precise reason. There have also been situations where contractors have driven heavily loaded trucks over areas of garage roofs that were not designed as driveways, and when this has happened without adequate temporary shoring, roof collapses have resulted. Contractors and building managers must be made aware of the fact that garage roof slabs are designed for a finite loading and there is, therefore, a limit to the degree of load or overload that roof structures can sustain.

Garage roof leaks can affect the very structure of the reinforced concrete work itself. Repairs must be made promptly and correctly. Often these repairs involve the complete removal of all landscaping and paved routes for people or vehicles. These paved routes are often dedicated fire routes which will be interupted during the period of repair. Current excellent information for waterproofing under landscaped areas and traffic decks over parking garages can be found in the Canadian Building Digests.

## Garage Lighting

Almost all older garages are underlit. This can contribute to security problems both for people and vehicles. Older garages were often lit using incandescent lighting. To improve the lighting it is necessary to both increase the quantity of light and, in the interest of economy, change from incandescent to fluorescent.

To obtain best results from the increased lighting, it is advisable to paint the garage interior a light colour. Simply painting the ceiling will make a major change in the lighting even if no fixture changes are made. Both increased light and painting are recommended in older garages. Fixture conversion and painting would cost approximately $320. per car. A 120 car garage would therefore cost $38,400. to upgrade in these ways. While these garage changes are not major ones, they make a very positive contribution to the safety of the building and can make dingy, unattractive garages more pleasant to use.

Most newer garages, those constructed in the last 8 or 10 years, do have fluorescent lighting. In these garages, only painting is necessary.

## Sprinklers

Sprinklers in garages can be troublesome. Older buildings (prior to 1970) were wet systems based on heated garages. These systems can freeze due to local drafts, broken doors and inadquately maintained heating. They are also subject to freeze-up due to inadequately sloped piping, sagging, inadequate drum drip installation or maintenance. Some wet sprinkler systems could be changed to a dry type to eliminate or cut down garage heating. Newer garages are more often protected by dry type sprinkler systems.

Converting from a wet to a dry type sprinkler system would cost approximately $140. per car.

## Garage Entrance Ramps

The ramps which serve parking structures usually are provided with heating devices to keep them clear of snow and ice in the winter. Two types of heating are used: electric resistance cable and hydronic (hot water). Both heating systems are maintenance prone. It is common to hear that owners of buildings where ramps are heated electrically remove these electric systems and replace them with hydronic, and that owners of building with hydronically heated ramps are replacing these with electric. Those owners who believe in electric heating, do so with absolute conviction. Those who believe in hydronic systems are similarly firm in their views.

Both systems can work well and relatively trouble free. As with many other issues, good design and workmanship during the initial installation is the key to success. Breaks in the electric resistance cable and in the hydronic piping are caused by rapid physical changes in the heating devices due to temperature changes when the heaters cycle on and off and the resistance to the change from the medium in which the heaters are placed. The heating devices require room to expand and contract since they are subject to more rapid change in dimension than the surrounding medium in which they are placed. This principal applies to both new installations as well as to repairs. The driving surface over the heating devices should be a type which is removable to access any point in the heating devices for repairs.

Replacement costs can be very high. An average two lane ramp could cost the following:

| | |
|---|---|
| Electrical Resistance Cable Replacement | $13,000. |
| New Glycol Heating System | 20,000. |
| New Concrete Topping or | 3,000. |
| Removable Paver Topping | 15,000. |

In an effort to minimize problems of thermal expansion, most owners simply keep the garage ramp heaters, either electric or hydronic, on at all times during the cold months. This is costly and energy inefficient. Adding snow sensing and temperature controls at a cost of $1,000. per ramp would save on unnecessary energy expenditure.

## 4.5 Occupant Safety

Conservation requirements and costs with regard to those building elements that relate to occupant safety can be significant and costly. Large numbers of apartment units are in place in which fire alarm systems do not meet current by-laws. Such buildings were constructed at a time when codes were less stringent and except where an individual owner elects to do so, they are generally not required to be retrofitted to comply with current by-laws. Distinguished exceptions to this are the Ontario Housing Corporation which has undertaken a retrofit program installing line voltage products of combustion detectors in all their dwelling units, and the Metropolitan Toronto Housing Corporation which has for many years been providing products of combustion detectors in their buildings for senior citizens. The MTHC are also noteworthy through their early policy of providing stand-by generators to operate emergency lighting and firefighter's elevators.

In 1977 the National Building Code introduced the new Emergency Voice Communication system as part of the life safety systems for high rise buildings of 120 feet measured between finished grade and the top floor, or 12 storeys in building height. Because of lack of standards in the first two to three years, most E.V.C. systems installed are non-supervised. Not until 1978 did the N.B.C. call for the system to be supervised. To meet the current standards, all buildings of 12 storeys and higher constructed prior to 1978 should be so equipped.

All recently constructed residential buildings are being equipped with stand-by emergency generators. Few buildings built before 1970 have this equipment and it is reasonable to expect that future code requirements will oblige that all buildings be so retrofitted. Such retrofitting would be a massive and costly undertaking. Not only would space have to be found for the stand-by generator and the generator itself installed, but significant wiring modifications would have to be made to the lighting and elevator system to make use of the power generated.

The retrofit section of the Ontario Fire Code will likely be addressing future changes to occupant safety provisions in existing buildings. Considerable disagreement exists as to the feasibility of changing and improving existing systems. The area most likely to be tackled first will be fire alarm systems and emergency lighting. Additional areas of concern include compartmentalization, smoke control, fireman's elevator and emergency power including upgrading of inadequate present provisions. Installation of a diesel generating system for an averaged sized apartment building would cost around $10,000.

It is reported that many stand-by generators fueled by natural or propane gas will not sustain load. That is, they will start up when an emergency demands, but are not able to either operate all the emergency equipment because they are undersize, or they start off operating the equipment very well but are unable to sustain the operating load for more than a few minutes. Diesel generators are reported as being more effective in this regard. All emergency stand-by generators are regularly start tested, however, this testing may not be carried out under load and for a required test time period. The implication is that significant re-designing of stand-by generator equipment and the installation of new equipment will be required. Emergency generators, whether located on the roof or inside buildings, are often not accessible in case of fire. Engines, however, do not require a lot of preventative maintenance, as long as they are located in a relatively dry atmosphere at normal room temperature.

We can expect that codes will one day require the retrofitting of all dwelling units with products of combustion detectors. If codes will permit the installation of battery operated equipment, costs for this will not be excessive. If codes require line voltage equipment, the costs could be relatively high. A battery operated detector can be purchased and contract installed for less than $50. per suite. A line voltage detector would cost in excess of $100.00 per suite, and this could be even higher depending on code requirements.

Emergency power may be useless if the cables feeding the system (elevator, pumps, lights, etc.) are not installed in fire rated enclosures. If new enclosures have to be constructed this would escalate the cost further.

## 4.6 Movement Systems

In general, movement systems in existing buildings are in good condition, largely due to two things: the general good quality of the equipment when it was installed, and requirements for regular maintenance of elevators. Elevator maintenance costs are significant. On a per dwelling unit basis, annual required maintenance costs are in the magnitude of $120. Despite the fact that elevators are very well maintained, we anticipate that many older elevators will have to be retrofitted with either or both new cabs and control systems. As codes require it in the future, elevators will also have to be retofitted to serve firefighter's needs and voice communication systems will have to be installed to serve the safety and security of the users. Installation cost for a fireman's elevator would be approximately $40,000. (depending on the building height). For a 120 suite building an emergency voice communications systems would cost $28,800.

Vandalism to elevators is a major concern. The costs can be of such magnitude that special attention is drawn to it. Elevator vandalism is largely attributed to young children, often surprisingly young; the elevators are treated as large toys. This problem exists primarily in family buildings where the repair bill averages $1,000. per cab per year. As well, elevator maintenance is contracted on a monthly basis. An average contract for a 120 unit family apartment complex with two elevators would cost between $400. and $600./month. This combined with the repair costs for vandalism can total $8,000. per year.

## 4.7 Equipment And Fitments

A miscellany of small interior items is included under this heading. Some property managers view these as very modest ongoing maintenance items and do not make special budget provisions for them.

Kitchen countertops are an abuse item. Plastic laminate counter tops can easily be damaged if simple care is not taken by the user. Many counter tops are damaged and burned by hot pots which are placed on the counter top without a protective trivet. Counter tops can also be damaged through scratching from the use of abrasive cleaners or from knife cut marks. Water which might leak around and under an imperfectly tightened kitchen sink rim can rot the wood substrate in a kitchen counter. Burned or damaged counters must be completely replaced. Some small proportion of kitchen cabinet door and drawer faces require replacement.

In some public sector housing constructed between the end of the second World War and about 1960, it was the economy of the time to provide kitchen cabinets and clothes closets without doors. Many dwelling units have already been upgraded through the provision of these doors, however some number remain to be done.

Bi-fold doors commonly used on closet openings are high maintenance items. These doors go out of adjustment easily if they are forced when they are opened or closed. The adjustment of these is fairly simple, however when the track and hardware are forced, the dispacement which occurs can often only be corrected by replacement. There are reports of projects in which bi-fold doors are being totally replaced with hinged or sliding doors on a demand basis.

Ceramic tile around bath tubs is a frequent source of ongoing maintenance. Tile installed on a non-waterproof substrate is subject to frequent failure requiring replacement of tile and substrate. Neglect of this common problem can lead to leaking of water to dwellings below. Repair of bathroom ceramic tile over a tub will be $100. to $400. a suite depending on the extent of repair necessary.

In some cases, damage to equipment and fitments inside a dwelling unit can be recovered as a direct charge to the tenant or deducted from rent deposits.

## 5.0 COSTS FOR CONSERVATION

### 5.1 Costing Method

The of costing is developed from the listing of conservation issues set out in Appendix A. Using the list of issues with related costs as a reference guide, a hypothetical model building was created to examine the conservation costs of an average building in Ontario. This included frequency factors and averages which would make this model representative of the existing building stock. The development notes for the costs are included in Appendix C. To further test the costs, five case study buildings were identified, inspected and analysed for conservation requirements. These included:

two private sector buildings,
two public sector buildings, and
one non-profit building.

It should be noted that the case study building costs were situational, and sometimes include issues which would normally seem of a maintenance nature but were of such high cost that they constituted a major expenditure. An example of this would be elevator vandalism or plaster repair.

Conservation expenditures for the 5 case studies as well as the hypothetical model were estimated in 1982 dollars over the next 20 years. These estimates are, we feel, conservative, and are in addition to the regular maintenance and operating costs that buildings would normally incur.

### 5.2 Hypothetical Building

Components of any building are subject to forces of wear and deterioration. The manner in which various components resist these forces is related to their age, design, workmanship and actions which may have been taken to preserve their integrity. It is difficult to estimate, with any accuracy, a definative cost for any component without being building specific.

To demonstrate the cost impact of conservation requirements over a 20 year peirod, we have prepared a simple summary for a hypothetical building. The assumptions for this hypothetical building are:

- 120 suites
- 15 to 20 years of age
- reinforced concrete structure
- 8 to 12 floors high
- underground parking garage of two levels
- double wythe masonry exterior walls
- single glazed windows

The summary assumes that each item of work identified as an individual issue requires "average" intervention. It does not include small items of maintenance, such as kitchen countertops, painting, bathroom tile, fitments etc. It also does not include costs related to site development, amenities, or energy conservation.

## CONSERVATION COSTS FOR HYPOTHETICAL BUILDING

### 1. WEATHER PROTECTION

| | | |
|---|---|---|
| Flat Roofing Systems | | |
| Conventional built-up roof system - one and half-time cost and ongoing repairs | $ 96,000.* | |
| or | | |
| Inverted roofing system - one time cost+ and minimum repairs | 67,200. | |
| Masonry Walls | | |
| Repairs - ongoing | 336,600.* | |
| or | | |
| Major conservation intervention:+ - one time cost | 207,000. | |
| Windows | | |
| Storm windows add on - one time cost some energy savings through reduced infiltration | 78,000.* | |
| or | | |
| Replacement with new thermal glazing and sash - one time cost | 300,000. | |
| Caulking | | |
| Ongoing programme | 10,800.* | |
| TOTAL | | $521,400. |

### 2. STRUCTURAL INTEGRITY

| | | |
|---|---|---|
| Shelf angles | $ 92,880. | |
| Masonry | 56,530. | |
| Balcony | 52,200. | |
| TOTAL | | 201,610. |

### 3. BUILDING SYSTEMS

| | | |
|---|---|---|
| Electrical | $112,710. | |
| Heating | 137,120. | |
| Plumbing | 111,825. | |
| Ventilation | 45,000. | |
| Lighting | 30,620. | |
| TOTAL | | 437,275. |

*Option selected to include in Total Costs

+Includes energy saving measures through increased insulation value

## 4. PARKING STRUCTURES

| | | |
|---|---|---|
| Suspended slab | $ 18,000. | |
| Traffic Membrane | 64,800. | |
| Roof slab | 36,660. | |
| Expansion joints | 20,000. | |
| Ramp | 35,000. | |
| TOTAL | | 174,460. |

## 5. OCCUPANT SAFETY

| | | |
|---|---|---|
| Fireman's Elevator | $30,000. | |
| Voice Communications Systems | 28,800. | |
| Emergency Power | 7,000. | |
| Product of Combustion | 3,570. | |
| TOTAL | | $ 68,570. |

Total costs for the apartment over the next twenty years would be:

| | |
|---|---|
| Weather Protection: roof, walls, windows | $ 521,400. |
| Structural Integrity | 201,610. |
| Parking Structures | 174,460. |
| Occupant Safety | 68,570. |
| Building Systems | 437,275. |
| TOTAL COSTS | $1,403,315. |

The cost per suite is $\frac{1,403,315}{120}$ = $11,694.00 per suite

## 5.3 Building Case Studies

The following are a series of building case studies which analyze the major conservation costs that will occur over the next twenty years. These costs cover only the major interventions required to preserve the essential fabric of each building. They do not include expected maintenance such as painting, cleaning, snow removal, appliance replacement etc. The costs also do not include site maintenance. They cover only the estimated expenditure in 1982 dollars, needed to preserve the life of the building and adequate living conditions within.

Each study entails one high-rise building with its specific characteristics and problems. Two of the case studies are private sector market rental buildings; two are publicly owned rent-greared-to-income family buildings, and one is a private non-profit senior citizens building. For the purposes of this report, the buildings will remain anonymous.

## BUILDING CASE STUDY NO. 1

### Description

Sector - Public
Age - Built 1958 - 24 years
Type - 7 one bedroom, 35 two bedroom, 54 three bedroom
Height - 15 stories
No. of Suites - 96
Dimensions - 38' x 190'
Parking - surface
Structure - reinforced concrete
Roof Type - conventional built-up roofing
Wall Construction - solid masonry on exposed floor slabs
Window Type - steel frame single glazing - casement opening
Amenity Areas - toddler playground

Due to the buildings' occupants, the building has suffered excessive vandalism and abuse and has subsequently been adapted into a hard surfaced, resistive building. This super-durability approach to the maintenance of the building contributes to its long term conservation. The existing maintenance program tends to replace in a large scale program, rather than patch on a piece meal basis. Therefore, in spite of the buildings abuse, it has been constantly well maintained, mainly from an internal working point of view.

### 1. WEATHER PROTECTION

### Flat Roofing System

The maintenance staff inspects the roofing regularly, making repairs to any exposed felts or apparent soaked insulation. This program is thought to get the longest possible life out of each roof. Unfortunately, no consideration is being given at this time to an inverted roof system even though the parapet and concrete structure will accommodate it.

- Replacement every 10-15 years
- Repairs - \$500./year - minor amount of roof scouring
- Flashing just replaced - prefinished aluminum
- Existing roof 5 years old - assume 2 replacements with conventional built-up roof systems.

Costs = \$500/year x 20 years + 2 roofs x \$320./suite x 96 suites
= \$10,000 + \$61,440
= \$71,440.

## Masonry Walls

It is the opinion of the maintenance staff that the building was extremely well constructed which has resulted in virtually no deterioration of the masonry or concrete walls. Visual inspection bore this out, at least in terms of the masonry walls.

The masonry penthouse which was excessively spalled and cracked due to water penetration and humid air exfiltration was the only real example of masonry deterioration.

The lack of horizontal control joints has caused some crushing at slab edges which have been parge repaired. A small amount of brick cracking was evident but almost negligible. Given the age of the building, it is safe to assume that concrete creep skrinkage will not progress and it is unnecessary to cut horizontal control joints in the building.

The concrete stairwells and shear walls appear to have some minor spalling but because of the existing patch and painting program (once every 3 years) the concrete has remained in good repair.

## Penthouse Repairs

- air seal on inside of masonry walls (parging)
- repair masonry i.e. tuck painting and brick replacement
- aluminum siding
- wall area 1,400 sq. ft.
- \$2./sq. ft. parge coat
- \$13./sq. ft. masonry repair (30% of wall surface)
- \$5.75/sq. ft. aluminum siding
- \$4./sq. ft. repainting - minor repairs

Cost = \$2./sq. ft. x 1,400 sq. ft. + \$4./sq. ft. x 1,400 sq. ft. x 30% +
\$5.75/sq. ft. x 1,400 sq. ft.
= \$12,530.

## Alternate

- assume no siding is applied and 30% brick repair must be done again in 10 years.

Cost = \$2./sq. ft. x 1,400 sq. ft. + \$13. ft. x 1,400 sq. ft. x 30% x 2
= \$13,720.

## Slab Edge Repairs

- \$25./lin. ft.
- total slab edge length - 6,840 lin. ft.
- 2% slab edges require repair

Cost = $25./lin. ft. x 6,840 lin. ft. x 2%
= $3,420.

Total = $29,670.

### Window Repairs

Although the maintenance staff feels the windows are well maintained, inspection showed caulking deterioration both around frames and glazing, as well as excessive infiltration, heat loss and condensation problems. Their directive is towards total retrofit with thermally resistive frames and double glazing.

Replacement costs are difficult to estimate because of integral spandrel and glass panel system.

| | |
|---|---|
| Window replacement per suite | $2,500. |
| No. of suites | 96. |

Cost for replacement = $2,500./suite x 96 suites
= $240,000.

## 2. STRUCTURAL INTEGRITY

There are no apparent problems in the building's structure. There is a minor amount of balcony deterioration but not enough to merit an estimate.

## 3. BUILDING SYSTEMS

### Electrical

The maintenance staff are finding that increased user need is overloading the electrical system. They predict a total upgrading of the main service and branch feeders.

| | |
|---|---|
| Main Service | $460./suite |
| Branch Feeders | $700./suite |

Cost = ($460. + $700.) x 96 suites
= $111,360.

### Heating

Heat is supplied by a central steam plant and transferred via heat exchanger to hot water heating. All radiators were changed recently. Isolation valves are changed as requiried, and there is no intention to install individual thermostats. Because of constant monitoring of systems, it is doubtful any automatic control systems will be installed.

heat exchanger, 1 every 20 years 6 x $800. = $4,800.
isolation valves, 75% replacement $180./suite

Cost = $4,800. + $180. x 96 suites x 75%
= $17,760.

## Plumbing

All galvanized plumbing has been replaced with copper. Brass fitting replacement is carried out on an ongoing program. Isolation valves are replaced as required.

Brass - $360./suite, replace 100%
Isolation Valves - $170./suite, replace 100%

Cost = ($360. + $170.) x 96 suites
= $50,880.

## Ventilation

If the windows are replaced, the maintenance staff feels the ventilation in the units must be upgraded. The corridor supply is considered adequate with regular maintenance.

Individual exhaust upgrading, $400./suite

Cost = $400./suite x 96 units
= $38,400.

## 5. OCCUPANT SAFETY

The building has an emergency diesel generator, fireman's elevator, and line smoke alarm system. These are routinely checked and tested. The only place for improvement would be an emergency voice communication system. This is unlikely to happen due to high vandalism.

Cost = $28,800.

## 6. MOVEMENT SYSTEMS

The elevators, as in most family, public, non-profit housing, are the target of tremendous vandalism. The existing system, considered vandal proof, costs $4,800./year, which is on top of the $6,000./year maintenance contract.

20 year cost = $216,000.

## 7. EQUIPMENT AND FITMENTS

Counter top replacement and cabinets must be replaced or rebuilt an average of once every ten years. Bathroom tile replacement is minimal due to major retrofit several years ago.

The main fitment problem is the deterioration of two coat plaster. This amounts to a $20,000./year maintenance cost. The problem is so extreme that the maintenance staff are considering a major retrofit to replace all ceiling plaster with drywall.

| | |
|---|---|
| - Counter top replacement - | $ 150./suite |
| - Cabinet Replacement - | $ 1,200./suite |
| - Plaster Repair - | $20,000./year |

Cost = $1,350./suite x 96 suites + $20,000./year x 20 years
= $130,560. + $400,000. = $530,560.

## ESTIMATED 20 YEAR COST FOR CASE STUDY NO. 1 FOR MAJOR CONSERVATION EXPENDITURES:

| | |
|---|---|
| **1. WEATHER PROTECTION** | |
| Roofing System | $ 71,440. |
| Masonry Walls | 29,670. |
| Windows | 240,000. |
| **2. STRUCTURAL INTEGRITY** | |
| No Cost | |
| **3. BUILDING SYSTEMS** | |
| Electrical System | 111,360. |
| Heating System | 17,760. |
| Plumbing System | 50,880. |
| Ventilation System | 38,400. |
| **4. PARKING STRUCTURES** | |
| No Cost | |
| **5. OCCUPANT SAFETY** | 28,800. |
| **6. MOVEMENT SYSTEMS** | 216,000. |
| **7. EQUIPMENT AND FITMENTS** | 530,560. |
| **TOTAL** | $1,334,870. |

COST PER SUITE = $13,905.

## BUILDING CASE STUDY NO. 2

### Description

Sector - Private
Age - 1971 - 11 years
Type - one and two bedroom
Height - 9 stories
No. of Suites - 170
Dimensions - each wing, 250 feet x 50 feet
Parking - 1 level underground
Structure - concrete
Roof Type - built-up roofing
Wall Construction - cavity wall construction - exposed slab edges
Window Type - single glazed aluminum
Amenity Areas - Tot lot

The building is basic developer stock with its share of poor workmanship, but generally has enjoyed a good maintenance program which has contributed to the overall good health of the building.

### 1. WEATHER PROTECTION

### Flat Roofing System

The roof is in poor condition suffering extreme roof scouring because of the low parapets and exposed site. The solution sought is to build up higher parapets and go to an inverted roofing system with heavy balast.

- Replacement every 15-20 years - $400./suite
- Repairs - $8./suite/year
- Parapet rebuilding - $20./lin. ft.
- Cant Strip replacement - $70./suite
- Parapet Flashing replacement - $30./suite

Costs = $400./suite x 170 suites + $8./suite x 170 suites x 20 years + $20./lin. ft. x 1000 ft. + $90./suite x 170 suites + $30./suite x 170 suites
= $19,200. + $20,000. + $20,400.
= $135,600.

### Masonry Walls

Masonry is in generally good condition with no reported wall leakage. There is some cracking due to lack of control joints but due to the age of the building, further concrete movement is unlikely. Some mortar deterioration was noted and probably will progress. Some tuck pointing repairs have been done previously on the building.

## Masonry Walls (cont'd)

- 6 vertical control joints 480 lin. ft. - $62.50/lin. ft.
- 3 horizontal control joints 2400 lin. ft. - $27./lin. ft.
- 20% masonry wall surface to be repointed over 20 years
- 9560 square feet repainting $4./sq. ft.

Cost = 480 lin. ft. x $62.50/lin. ft. + 2400 lin. ft. x $27./lin. ft. +
9560 sq. ft. x $4./sq. ft.
= $30,000. + $64,800. + $38,240.
= $133,040.

## Slab Edge and Shear Walls

All exposed concrete had been parge painted at one time owing to the rather coarse concrete workmanship. This coating is now starting to spall off.

- assume 75% of concrete area will have to be re-coated
- 9,000 sq. ft. $2./sq. ft.

Cost = 9000 sq. ft. x $2./sq. ft.
= $18,000.

## Window Repairs

The owners are planning a storm window retrofit with an overall recaulking.

Cost = 170 suites x $600./suite
= $102,000.

## 2. STRUCTURAL INTEGRITY

There are no apparent structural problems with the building except for balcony inserts spalling. Approximately 75% of balconies have had some form of patch work.

- assume 75% of balconies will need some concrete repair
- $400./balcony

Cost = $400./balcony x 170 balconies x 75%
= $51,000.

## 3. BUILDING SYSTEMS

### Electrical System

The owner expects to have to do some major electrical retrofitting in the future due to increasing appliance loads.

Cost = $50,000.

### Exterior Lighting

Vanadalism contributes to a high repair cost of $1,000./year

Cost = $1,000./year x 20 years
= $20,000.

### Heating

The building has recently been retrofitted with automatic controls which vary the water flow and chemical mix. The owners are not going to install individual thermostats due to the energy wastage by tenants' neglect. Isolation valves are replaced on a demand basis. The building is heated by four copper tubed boilers.

- boiler heat exchanger $2,500./boiler - replace once
- 50% of isolation valves $180./suite

Cost = $2,500./boiler x 4 boilers + $180./suite x 50% x 170 suites
= $10,000. + $15,300.
= $25,300.

### Plumbing

Brass fitting replacement and isolation valves are replaced on a demand basis.

Hot water Retrofit - $450./suite, replace once in 20 years
Brass - $360./suite, replace 50%
Isolation Valves - $170./suite, replace 50%

Cost = ($360. + $170.) x 170 suites x 50% + $450./suite x 170 suites
= $45,050. + $76,500.
= $121,550.

### Ventilation Systems

Aside from ongoing maintenance, the owners feel the ventilation system is quite adequate. They are inclined towards installing automatic controls.

- counter top, $150./suite
- cabinets, $1,200./suite 50% of suites

Ventilation Systems (cont'd)

Cost = $150./suite x 170 suites + $1,200./suite x 170 suites x 50%
= $25,500. + $102,000.
= $127,500.

## 4. PARKING STRUCTURE

There was some spalling and slab disintegration especially around outside columns and piers. This is probably due to the lack of expansion joints in the slab. The lighting level was low and reflective paint is planned to alleviate the problem. Because of the low use, a protective coating is unnecessary. There are some foundation wall cracks, approximately 100 feet worth. 50% of the parking has a roof slab which can be expected to leak eventually. Assume 25% will require re-waterproofing. The heating ramp has already been subject to breakdown and can be expected to need a total retrofit over the next 20 years.

| | |
|---|---|
| - Spalling repair | $150./car x 50% of slab surface |
| - expansion joint | $32./lin. ft. x 300 ft. required |
| - painting | $160./car |
| - foundation cracking | $15./lin. ft. + $70. waterproofing x 100 ft. |
| - roof slab repair | $611./car x 25% |
| - ramp replacement | $13,000. + $3,000. Topping, $500./year repair |

Cost = $150./car x 170 cars x 50% + $32./lin. ft. x 300 ft. + $160./car x 170 cars
+ $85./lin. ft. x 100 ft. + $611./car x 170 cars x 25%
+ $16,000. + $500./year x 20
= $12,750. + $9,600. + $27,200. + $8,500. + $25,968. + $26,000.
= $110,018.

## 5. OCCUPANT SAFETY

Major upgrading could be done in this area. The building lacks a firemans elevator and does not have an emergency generator. The present alarm and smoke detection systems are adequate.

- Firemans elevator - $40,000.
- Emergency generator - $10,000.

Cost = $50,000.

## 6. MOVEMENT SYSTEMS

The building's main occupants are families which results in a high amount of elevator vandalism.

- $2,000./year vandal repairs, $6,000./year maintenance

Cost = ($2,000. + $6,000.) x 20 years
= $160,000.

## ESTIMATED 20 YEAR COST FOR CASE STUDY NO. 2 FOR MAJOR CONSERVATION EXPENDITURES:

### 1. WEATHER PROTECTION

| | |
|---|---|
| Roofing System | $ 135,600. |
| Masonry Walls | 133,040. |
| Slab Edges and Shear Walls | 18,000. |
| Window Retrofit | 102,000. |

### 2. STRUCTURAL INTEGRITY

| | |
|---|---|
| Structural Repairs | 51,000. |

### 3. BUILDING SYSTEMS

| | |
|---|---|
| Electrical | 50,000. |
| Exterior Lighting | 20,000. |
| Heating | 25,300. |
| Plumbing | 121,550. |
| Ventilation | 52,000. |

| | |
|---|---|
| **4. PARKING STRUCTURES** | 110,018. |
| **5. OCCUPANT SAFETY** | 50,000. |
| **6. MOVEMENT SYSTEMS** | 160,000. |
| **7. EQUIPMENT AND FITMENTS** | 127,500. |
| **TOTAL** | $1,156,008. |

COST PER SUITE = $6,800.

## BUILDING CASE STUDY NO. 3

### Description

Sector - Public
Age - Built 1969 - 14 years
Type - Bachelor and one bedroom
Height - 18 stories
No. of Suites - 352
Dimensions - each wing 50 ft. x 150 ft.
Parking - 1 level underground
Structure - concrete
Roof Type - built-up roofing
Wall Construction - cavity wall construction on shelf angles
Window Type - single glazed aluminum
Amenity Areas - ground floor level - senior citizens and community centre

This building houses exclusively senior citizens which reduces the amount of wear and tear incurred. The building has undergone several major interventions. One involved major wall reconstruction shortly after the building's completion. Another was the total replacement of the garage roof slabs waterproof membrane. Both of these were enormous capital expenditures.

## 1. WEATHER PROTECTION

### Flat Roofing System

Replacement of roofing every 10-12 years plus regular checks and maintenance are carried out on this building.

- replacement $320./suite
- maintenance $16./suite/year
- because of the large quantity of small suites - multiply by half

$$\text{Costs} = (\$320. + \$320.) \times \frac{352}{2} \text{ suites}$$

$$= \$112,640.$$

### Cant Strip Replacement

Due to the extremely low parapet, excessive wind scouring occurs at the perimeter of the building. This combined with the use of galvanized flashing will incur at least one total replacement of the cant strip and flashing.

- cant strip replacement - $90./suite
- flashing replacement - $30./suite

## Cant Strip Replacement (cont'd)

Cost = $120./suite x 76
= $21,120.

## Masonry Walls

Major reconstruction of the masonry was required shortly after construction. This was caused by concrete creep and poor shelf angle installation. Presently there is only one horizontal control joint and no vertical ones. The masonry itself is in good condition except for some hairline mortar cracking. There appears to be some bowing which might indicate stress from concrete shrinkage (creep).

| | |
|---|---|
| - install horizontal control joints | - $27./ft. every other floor |
| - install 6 vertical control joints | - $62.50/ft. |
| - install weep holes at shelf angles | - $5./ft. |
| - repair 5% of shelf angle (repair and replacement) | - $30./ft. |
| - building perimeter 750 feet | |
| - building height 162 feet | |

Cost = $27./ft. x 6,000 ft. + $62.50/ft. x 162 ft. x 6 + $30./ft. x 12,000 x 5%
= $162,000. + $60,750. + $18,000.
= $240,750.

## Window Repairs

The maintenance staff plans to retrofit all windows with interior storms.

- retrofit with interior storm windows regularly, $600./suite; because of reduced size of suite assume $300./suite.

Cost = $300./suite x 352 suites
= $105,600.

## 2. STRUCTURAL INTEGRITY

There is some concrete spalling at balcony inserts. Over twenty years this would probably involve 75% of all the balconies.

Cost = $400./balcony x 352 balconies x 75%
= $105,600.

## 3. BUILDING SYSTEMS

### Heating

Automatic controls are going to be installed. Heating system consits of 9 copper tube boilers. Maintenance amounts to $500. per year. Isolation valves are replaced on demand. Given the age of the building assume 50% will have to be replaced.

- heat exchanger, 1 per boiler once over 20 years - $2,500.
- isolation valve, $180./unit
- auto control - $5,000./unit - 2 units

Cost = $2,500./boiler x 9 boilers + $180./suite x 352 suites x 50% + $5,000./unit x 2 units
= $22,500. + $31,680. + $10,000.
= $64,180.

### Plumbing

The main areas of cost are the replacement of plumbing brass and isolation valves. The domestic hot water system will need upgrading.

| | | |
|---|---|---|
| - Brass | $360./suite | - replace 50% |
| - Isolation Valves | $170./suite | - replace 50% |
| - Hot Water | $450./suite | |

Cost = ($360. + $170.) x 352 suites x 50% + $450. x 352 suites
= $93,280. + $158,400.
= $251,680.

### Ventilation

Aside from ongoing maintenance the staff feel the system is functioning adequately. Auto controls have been installed to reduce heat loss during low demand night time operation.

- one retrofit of main system $300/suite

Cost = $300./suite x 352 suits
= $105,600.

## 4. PARKING STRUCTURE

The garage is not used to capacity and hence has little or no damage. The leaking roof membrane has been totally retrofitted so at present the only apparent problem is the heated garage ramp. The owners intent is to cover it rather than repair the heating elements and the slab.

Cost = $30,000.

## 5. OCCUPANT SAFETY

The building requires an emergency power generator and a firemans elevator. Being a senior citizens building, it is likely to require an emergency voice communications system.

- Firemans elevator - $40,000.
- Generator - $10,000.
- Emergency voice communications system - $228./suite

Cost = $40,000. + $10,000. + $228. x 352 suites
= $130,256.

## 6. MOVEMENT SYSTEMS

Low vandalism is mainly due to occupants.

- maintenance cost = $600./month

Cost = $144,000.

## 7. EQUIPMENT AND FITMENTS

There is a minor amount of cabinet and counter top repair and replacement. The main problem is in plaster blow out which is an ongoing expensive problem.

- cabinets $1,200./suite replace 25%
- counter tops $150./suite
- plaster $10,000./year

Cost = $1,200./suite x 352 suites x 25% + $150./suite x 352 suites + $5,000./year x 20 years
= $105,600. + $52,800. + $100,000.
= $258,400.

## ESTIMATED 20 YEAR COST FOR CASE STUDY NO. 3 FOR MAJOR MAINTENANCE AND CONSERVATION EXPENDITURES:

| | |
|---|---|
| **1. WEATHER PROTECTION** | |
| Roofing System | $ 112,640. |
| Cant Strip Replacement | 21,120. |
| Masonry Walls | 240,750. |
| Window Repairs | 105,600. |
| **2. STRUCTURAL INTEGRITY** | 105,600. |
| **3. BUILDING SYSTEMS** | |
| Heating | 64,180. |
| Plumbing | 251,680. |
| Ventilation | 105,600. |
| **4. PARKING STRUCTURE** | 30,000. |
| **5. OCCUPANT SAFETY** | 130,256. |
| **6. MOVEMENT SYSTEMS** | 144,000. |
| **7. EQUIPMENT AND FITMENTS** | 258,400. |
| **TOTAL** | $1,569,826. |
| **COST PER SUITE** = | $4,460. |

## BUILDING CASE STUDY NO. 4

### Description

Sector - Private
Age - Built 1955 - 28 years
Type - bachelor and one bedroom
Height - 11 stories
No. of Suites - 103
Dimensions - 50 ft. x 100 ft.
Parking - on grade
Structure - concrete incased steel - steel joists
Roof Type - built-up flat roof
Wall Construction - solid masonry on exposed slab edge
Window Type - single glazed in steel frames
Amenity Areas - variety store

## 1. WEATHER PROTECTION

### Roofing System

The roof condition is poor with exposed felts (due to roof scouring) starting to leak, especially at the roof edge. The parapet is merely a flashing curb and corroded in places. It is probable that the flashing and cant will have to be replaced along with the roof. Because of the steel joist systems, an inverted roof system cannot be applied. The roof scouring seems to be extremely excessive and the summary reason for failure. A single ply membrane roof would be the solution.

| | |
|---|---|
| - cant strip replacement | $90./suite |
| - flashing | $30./suite |
| - membrane roof | $500./suite |
| - maintenance | $4./suite/year |

Cost = ($90. + $30. + $500. + $80.) x 103 suites
= $700./suite x 103 suites
= $72,100.

### Masonry Walls

Major paint work and brick replacement has been undertaken on the building prior to the present owners' takeover of the building in 1977. Approximately 50% of the masonry was repaired. Assume another 50% will have to be done within the next 20 years.

The penthouses are severely cracked and spalled and will require tuck pointing to 75% of its surface and brick replacement to 25%.

### Masonry Walls (cont'd)

- penthouse masonry area = 1,725 sq. ft. 75% = 1,294 sq. ft.
- building masonry area = 14,500 sq. ft. 50% = 7,250 sq. ft.
- repainting $4./sq. ft.
- brick replacement $13./sq. ft.

Cost = $13./sq. ft. x 3,625 sq. ft. + $4./sq. ft. x 3,625 sq. ft. + $13./sq. ft. x 431 sq. ft. + $4./sq. ft. x 1,294 sq. ft.
= $47,125. + $14,500. + $5,603. + $5,176.
= $72,404.

### Window Repairs

The steel frame windows are badly corroded and promote excessive infiltration. Storm windows would alleviate infiltration but total retrofit would be needed later to replace the frames.

- replacement $2,000./suite

Cost = $2,000./suite x 103 suites
= $206,000.

## 2. STRUCTURAL INTEGRITY

The basic structure of the building is sound. There is some spalling of balcony slabs at the inserts and at the cantilevered steel joists. Over 20 years, this would involve all balconies.

- $400./balcony

Cost = $400./balcony x 103 balconies = $41,200.

## 3. BUILDING SYSTEMS

### Electrical

A major revamping of the system is likely.

| | |
|---|---|
| - branch feeders | $700./suite |
| - main service | $460./suite |
| - exterior lighting | - $1,000./year |

Cost = $1,160.suite x 103 suites + $20,000.
= $139,480.

### Heating

Although the boiler has regular inspections, it will need to be replaced. Will require 3 steel tube boilers. Given the age of the building, assume all isolating valves will have to be replaced.

- 2 boilers $80,000./boiler
- isolation valves $180./suite

Cost = $80,000. x 2 + $180./suite x 103 suites
= $160,000. + $18,540.
= $178,540.

### Plumbing

Plumbing expenditures involve brass and isolation valve replacement as well as one update of the domestic hot water system.

| | |
|---|---|
| - Brass | - $360./suite replace 50% |
| - Isolation Valves | - $170./suite replace 100% |
| - Hot water | - $450./suite |

Cost = ($360. x 50% + $170. + $450.) x 103 suites
= $82,400.

### Ventilation

If the windows are retrofitted, the individual suite ventilation will be found to be inadequate.

| | |
|---|---|
| Individual suite ventilation retrofit | $400./suite |
| General system retrofit | $300./suite |

Cost = ($300. + $400.) x 103 suites
= $72,100.

## 4. PARKING STRUCTURES

The building originally was open on the bottom floor. It was then enclosed to create some individual car garages. These are unheated, wet sprinklered areas subdivided by fire walls. The only maintenance problem is garage door replacement. Assume 50% of doors will have to be replaced.

- sprinkler system change over to dry system - $140./car
- garage door x 10 doors at $1,200.

Cost = $12,000. + $140. x 40 cars
= $17,600.

## 5. OCCUPANT SAFETY

The building requires a fireman's elevator and an emergency generator.

Firemans' Elevator - $40,000.
Generator - $10,000.

Cost = $50,000.

## 6. MOVEMENT SYSTEMS

The cost of vandalism is extremely low in this building.
Maintenance Contract - $500./month

Cost = $120,000.

## 7. EQUIPMENT AND FITMENTS

Two coat plaster blow outs are a problem amounting to $2,000./year.

- counter tops $150./suite - replace - 100%
- cabinets $1,200./suite - replace - 50%

Cost = ($1,200. x 50% + $150.) x 103 suites + $2,000. x 20 years
= $77,250. + $40,000.
= $117,250.

## ESTIMATED 20 YEAR COST FOR CASE STUDY NO. 4 FOR MAJOR CONSERVATION EXPENDITURES:

| | |
|---|---|
| 1. WEATHER PROTECTION | |
| Roofing System | $ 72,100. |
| Masonry Walls | 72,404. |
| Window Repairs | 206,000. |
| 2. STRUCTURAL INTEGRITY | 41,200. |
| 3. BUILDING SYSTEMS | |
| Electrical System | 139,480. |
| Heating System | 178,540. |
| Plumbing System | 82,400. |
| Ventilation System | 72,100. |
| 4. PARKING STRUCTURE | 17,600. |
| 5. OCCUPANT SAFETY | 50,000. |
| 6. MOVEMENT SYSTEMS | 120,000. |
| 7. EQUIPMENT AND FITMENTS | 117,250. |
| TOTAL | $1,051,824. |

COST PER SUITE = $10,212.

## BUILDING CASE STUDY NO. 5

### Description

Sector - Private Non/Profit
Age - Built 1968 - 14 years
Type - Bachelors and one bedrooms
Height - 22 stories
No. of Suites - 160
Dimensions - 65' x 65'
Parking - underground
Structure - concrete column and slabs
Roof Type - inverted roofing
Wall Construction - brick masonry on exposed slab
Window Type - single glazed aluminum windows
Amenity Areas

### 1. WEATHER PROTECTION

#### Roof System

Inverted roof system is to be applied and should last without replacement for duration of 20 year period.

Inverted roof system $400./suite
Maintenance = $8./suite/year = $160./suite

Costs = $400. + $160. x 160
= $10,000 + $61,440
= $89,600.

#### Masonry Walls

Building requires large amounts of brick repointing and repair, and then will have an exterior metal cladding applied.

- Repointing - assume 50% of masonry surface = 14,880 sq. ft. - $4./sq. ft.
- Cladding and insulation $333,000.

Costs = $59,520. + $333,000.
= $392,520.

#### Window

Storm window programme is already underway.

Cost = $95,000.

## 2. STRUCTURAL INTEGRITY

Most of the building is structurally sound except for balcony slabs which are spalling at the inserts and top side.

- \$400./balcony - assume 100% of balconies will require repair

Cost = \$400./balconies x 160 balconies
= \$64,000.

## 3. BUILDING SYSTEMS

### Heating

Four roof top copper tubed boilers all probably will require new heat exchangers over 20 year period. Isolation valves replaced on a per demand basis.

- heat exchanger \$2,500./boiler
- flush out \$500./boiler/5 years
- isolation valves \$180./suite - replace 75%

Cost = \$2,500. x 4 + \$500. x 4 x $\frac{20}{5}$ + \$180. x 160 suites x 75%
= \$10,000. + \$8,000. + \$21,600.
= \$39,600.

### Plumbing

Brass replacement - \$360./suite replace 100%
Isolation valve replacement - \$170./suite replace 100%
Hot water upgrade - \$450./suite

Cost = (\$360. x 50% + \$170. x 75% + \$450.) x 160 units
= \$757.50 x 160 units
= \$121,200.

### Ventilation

General system retrofit - \$400./suite
Individual suite retrofit - \$400./suite
Auto controls - \$500./unit x 2 units

Cost = \$(300. + \$400.) x 160 units + \$500./unit x 2 units
= \$112,000. + \$1,000.
= \$113,000.

## 4. PARKING STRUCTURE

There is some spalling and the garage requires a traffic bearing membrane. The heated ramp, like most, needs repair and will probably need a total retrofit sometime in the next 20 years.

- $150./car slab repairs
- $13,000./ramp + $3,000. for topping
- $500./year maintenance on ramp
- $140./car convert from wet sprinkler to dry
- $600./car - traffic bearing membrane

Cost = ($150. + $140. + $600.) x 160 cars + $13,000. + $3,000. + $10,000.
= $142,400 + $26,000.
= $168,400.

## 5. OCCUPANT SAFETY

Existing generator is a roof top variety, fueled by natural gas. This must be replaced with a diesel driven one on grade.

Because of the senior citizen occupancy there should be an emergency voice communications system.

- E.V.C.S. - $228./suite
- Generator - $12,000.

Cost = $228./suite x 160 suites + $12,000.
= $36,480. + $12,000.
= $48,480.

## 6. MOVEMENT SYSTEMS

Maintenance cost $800./month

Cost = $800. x 12 x 20
= $192,000.

## 7. EQUIPMENT AND FITMENTS

| | |
|---|---|
| Plaster repair | - $60,000. |
| Cabinet replacement | - $1,200./suite x 50% |
| Counter replacement | - $150./suite x 100% |

Cost = $60,000. + ($1,200. x 50% + $150.) x 160 suites
= $60,000. + $120,000.
= $180,000.

## ESTIMATED 20 YEAR COST FOR CASE STUDY NO. 5 FOR MAJOR MAINTENANCE AND CONSERVATION EXPENDITURES:

| | |
|---|---|
| **1. WEATHER PROTECTION** | |
| Roofing System | $ 89,600. |
| Wall System | 392,520. |
| Window Repairs | 95,000. |
| **2. STRUCTURAL INTEGRITY** | 64,000. |
| **3. BUILDING SYSTEMS** | |
| Heating System | 39,660. |
| Plumbing System | 121,200. |
| Ventilation System | 113,000. |
| **4. PARKING STRUCTURES** | 168,400. |
| **5. OCCUPANT SAFETY** | 48,480. |
| **6. MOVEMENT SYSTEMS** | 192,000. |
| **7. EQUIPMENT AND FITMENTS** | 180,000. |
| **TOTAL** | $1,503,800. |

COST PER SUITE = $9,379.

## 5.4 Case Study Summary Results

The following is a listing of the case study results in terms of cost per suite over a twenty year period.

| Case Study | No. of Suites | Total Cost | Cost per Suite |
|---|---|---|---|
| No. 1 | 96 | $1,334,870. | $13,905. |
| No. 2 | 170 | 1,156,008. | 6,800. |
| No. 3 | 352 | 1,569,826. | 4,460. |
| No. 4 | 103 | 1,051,824. | 10,212. |
| No. 5 | 160 | 1,503,800. | 9,379. |
| Hypothetical Study | 120 | 1,403,315. | 11,694. |
| | | AVERAGE | $10,236. |

## 5.5 Case Study Twenty Year Cost Distribution

| Case Study | 1982 | 1987 | 1992 | 1997 | 2007 |
|---|---|---|---|---|---|
| No. 1 | | 20% | 30% | 30% | 20% |
| No. 2 | | 50% | 10% | 20% | 20% |
| No. 3 | | 30% | 20% | 10% | 40% |
| No. 4 | | 50% | 20% | 10% | 20% |
| No. 5 | | 40% | 20% | 20% | 20% |
| AVERAGE | | 38% | 20% | 18% | 24% |

# APPENDIX A

## Cost Analysis Issue Sheets

## Appendix A List of Contents

1. Weather Protection
   - 1.1 Failure of Flat Roofing Systems
   - 1.2 Roof Scouring
   - 1.3 Flashing Failure on Highrise
   - 1.4 Leakage at Masonry Parapet Cap
   - 1.5 Roof Leakage at Parapet Walls
   - 1.6 Wall Leakage - Brick and Precast
   - 1.7 Large Scale deterioration of mortar and brick on east walls
   - 1.8 Brick Penthouse Disintegration
   - 1.9 Leaking expansion joints in subgrade walls
   - 1.10 Water Penetration in Below Grade Walls
   - 1.11 Steel Framed Windows
   - 1.12 Water penetration through masonry walls around window frames
   - 1.13 Caulking Deterioration
   - 1.14 Leaking exposed slab edges

2. Structural Integrity
   - 2.1 No Vertical Control Joints
   - 2.2 No Horizontal Control Joints
   - 2.3 Cracks in masonry and concrete parapets
   - 2.4 Lack of sufficient masonry ties
   - 2.5 Missing Shelf Angles
   - 2.6 Shelf Angles Not Anchored
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ISSUE SHEET 1.1

| | |
|---|---|
| **APPENDIX:** | COST ANALYSIS |
| **CATEGORY:** | Weather Protection |
| **ISSUE:** | Failure of Flat Roofing Systems<br>Types - Built up Asphalt - flat and sloped<br>- Built up Tar - flat and sloped<br>- Protected Membrane<br>Roof life estimated at 20 years - frequently less<br>Reasons - age, poor installation, poor maintenance, inadequate insulation. |
| **SYMPTONS:** | - visible leakage below roof<br>- mushy insulation<br>- swelling and bulging surface<br>- loss of adherance - roofing can become wind lifted<br>- cold zones on treat sensitive photograph<br>- inadequate insulation for today's code requirements. |
| **IMPLICATIONS:** | - defacement and destruction of interior finishes and environment<br>- structural deterioration<br>- freeze-thaw in exterior walls<br>- potential electrical hazard<br>- heat loss<br>- deterioration of insulation<br>- expensive to repair<br>- major costs when repair/replacement is necessary. |
| **ACTION:** | - total replacement using better systems - remedial work to water damaged areas<br>- sweep repair, repour, regravel<br>- Reports indicate that sloped flat roofs especially protected membrane roofs are more maintenance free and lat longer than conventional roofing. |
| **COST FACTORS:** | - 50% all roofs initially<br>100% all roofs over 20 years<br>- roof life 15-20 years. |
| **COST:** | Replacement - $320./suite<br>Repair - $16./suite/year |

Issue Sheet 1.2

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Roof Scouring
- roofing gravel blown around by turbulance at roof level
- due to insufficient roofing emulsion to band gravel
- low parapets
- unusual wind situations

**SYMPTOMS:**
- gravel piled up in areas
- exposed roofing felts

**IMPLICATIONS:**
- exposed roofing felt deteriorates due to exposure
- interior flahsing can become battered and damaged

**ACTION:**
- sweep and flood coat bare areas
- repair damage felts
- respread gravel

**COST FACTORS:** - all building - preventative maintenance

**COST:** - $16./suite/year

Issue Sheet 1.3

**APPENDIX** **COST ANALYSIS**

**CATEGORY:** Weather Protection

**ISSUE:** Flashing Failure on Highrise
- due to high winds
- design of anchoring insufficient

**SYMPTONS:**
- lifting and removal of flashings by wind

**IMPLICATIONS:**
- water damage on interior of walls
- hazard of flying object

**ACTION:**
- if lifted - repair
- replacement

**COST FACTORS:**
- all buildings will require flashing replacement once in 20 years

**COST:** $30./suite

Issue Sheet 1.4

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Leakage at Masonry Parapet Cap
- due to inadequate, damaged or deteriorated flashing
- or in older building with stone or solid masonry caps with no through wall flashing or damp proofing

**SYMPTONS:**
- water penetration into interior spaces
- effluorescence and spalling of parapet mortar
- deterioration of parapet mortar
- shifting parapet

**IMPLICATIONS:**
- water penetration causing damage to wall interior, structure insulation and defacing interior environment
- major costs due to damage

**ACTION:**
- tuck point repair of masonry, rebuild if necessary
- install through wall flashing with masonry caps
- install new flashings over top of wall

**COST FACTORS:** - 35% of building stock

**COST:**
- \$50./suite - brick parapet
- \$60./suite - stone parapet

Issue Sheet 1.5

APPENDIX COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Roof Leakage at Parapet Walls

- due to deterioration of cant strip
- inadequate flashing
- expansion and contraction
- poor workmanship

**SYMPTONS:**

- water leaking into interior of building
- cant strip mushy and deteriorated
- visible cracks in membrane at cant
- fluorescence and spalling visible from outside at parapet

**IMPLICATIONS:**

- damage to interior finishes and environment
- damage to wall insulation and structure
- costly repairs

**ACTION:**

- replace cant strip - repair roofing - replace gravel
- ensure the parapet flashing protects cant
- replace cant and perimeter roofing with flexible roofing flashing system, i.e. Tremline or Maraflex

**COST FACTORS:**

- replacement of cant strip and parapet flahsing - 10-15 years

**COST:**

- cant strip $90./suite
- flashing $30./suite

Issue Sheet 1.6

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Wall Leakage - Brick and Precast
due to many forces - mainly poor design and/or workmanship, e.g. lack of expansion joints, control joints, solid rather than cavity or rainscreen wall

**SYMPTONS:**

- water penetration into interior
- cracks and openings - spalled brick and mortar joints
- deterioration of interior finishes

**IMPLICATIONS:**

- water penetration causes internal defacement of interior
- heat loss
- freeze/thaw cycle causes brick deterioration, bulging walls and perhaps collapse of masonry walls

**ACTION:**

- major wall rebuilding
- tuck pointing and brick replacement
- install expansion joints and control joints

**COST FACTORS:** - estimated 5% of brick surfaces
5% repointing

**COST:** replacement - veneer $13./sq. ft.
- repointing $4./lin. ft.

Issue Sheet 1.7

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Large Scale deterioration of mortar and brick on east walls. This due to inadequate rain screen principles, inadequate air/vapour barriers.

**SYMPTONS:** Mortar and Bricks loosening, spawling, and falling out.

**IMPLICATIONS:**

- danger of wall cladding falling off
- water penetration into wall cavity - deteriorating insulation, deteriorating wall anchors, causing structural damage by rot or freeze thawing
- costly repairs.

**ACTION:**

- tuck pointing - cosmetic repair
- alternate cladding, i.e. metal siding
- wall replacement with proper air/vapour barrier installation.

**COST FACTORS:**

- 50% of building stock may require this treatment

**COST:** $2,300./suite

Issue Sheet 1.8

APPENDIX: COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Brick Penthouse Disintegration

- due to unusual wind loads and pressure differences
- wind driven moisture

**SYMPTONS:**

- excessive spalling - brick loosening
- water penetration

**IMPLICATIONS:**

- destruction of penthouse face
- water penetration - internal damage to walls and equipment

**ACTION:**

- reclad with weather proof material i.e. siding using air seal layer in correct location.

**COST FACTORS:**

- 50% of building stock - one time replacement

**COST:**

- $140./suite

Issue Sheet 1.9

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Leaking expansion joints in subgrade walls.
Problems after three to four years if not immediate

**SYMPTONS:** Water coming through the joint and running down the wall.

**IMPLICATIONS:** Generally this is a cosmetic condition that does not develop into a serious structural problem.

**ACTION:** The most effective action is to excavate on the outside wall and re-seal or re-waterproof the joint. On deep walls more than one storey high this is not always feasible and the sealing of the joint must be done from the inside. If there is a high head of water involved the repairs on the inside may be difficult to execute and may require periodic maintenance.

**COST FACTORS:** 10% of all buildings, average of 6 joints per building

**COST:** $2,000./joint

Issue Sheet 1.10

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Water Penetration in Below Grade Walls

- due to change in ground water pressure
- clogged weeping tile drainage
- inadequate waterproofing
- cracking of walls for many reasons

**SYMPTONS:**

- water penetration through walls
- staining and discolouration

**IMPLICATIONS:**

- flooding - destruction of interior environments and contents
- major costs where repairs are necessary

**ACTION:**

- epoxy injections
- dig up and replace drainage system with gravel backfill
- rewaterproof exterior
- install sump pump and well

**COST FACTORS:**

- 10% of building stock affected
- assume 5 leaks, 100 ft. of drainage repair, and 10 ft. of water proofing.

**COST:**

- epoxy injection - $200./leak
- replace drainage system - $63./lin. ft.
- re-waterproofing - $70./lin. ft.

Issue Sheet 1.11

APPENDIX: COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Steel Framed Windows

- Deterioration of frames and wall openings due to incomplete vapour barrier and/or air seal, age of windows, neglected maintenance
- windows wind-blown out of allignment on high rise units.

**SYMPTONS:**

- visible rusting
- deterioration of masonry and interior plaster around window
- brick spalling
- excessive air leakage.

**IMPLICATIONS:**

- disfigurement of building exterior and interior surface
- heat loss
- deterioration at wall opening

**ACTION:**

- ongoing maintenance of window frames, i.e. corrosion
- recaulking
- replacement of window and frame
- repair and installation of exterior storm window.

**COST FACTORS:**

- all windows prior to 1970 - 70% of building stock
- 5 windows per suite
- maintenance every 5 years

**COST:**

- storm window replacement - $650./suite
- maintenance - $30./window

Issue Sheet 1.12

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Water penetration through masonry walls around window frames. Masonry penetration can be noticed after severe rain storms. At windows it may take one or more years depending on quality of caulking.

**SYMPTONS:** Deterioration of plaster finish on the interior of walls; efflorescence on exterior face of masonry. If conditions are very severe and drainage is impeded ice lensing could cause a break up of the wall assembly.

**IMPLICATIONS:** Associated problems are generally cosmetic except where ice lensing becomes a problem in which case the walls could tend to self destruct.

**ACTION:** Tuck pointing or tape grouting of the mortar joints and reworking of the caulking around the window frames.

**COST FACTORS:** 15% of all building stock, assume once every 10 years.

**COST:** pointing $4./sq. ft.
caulking $50./window

Issue Sheet 1.13

APPENDIX: COST ANALYSIS

**CATEGORY:** Weather Protection

**ISSUE:** Caulking Deterioration
- due to age, inferior material, poor installation, poor maintenance, incorrect material used.

3 - 5 year - 25% of caulking
10 years - 75% of caulking.

**SYMPTONS:**
- air infiltration, around windows and openings
- water penetration at flashing, building joints
- caulking appears brittle, cracked, pulled away from surfaces.

**IMPLICATIONS:**
- costly heat loss due to infiltration
- water penetration causing damage to building fabric and interior
- ongoing moderate costs

**ACTION:**
- Clean out existing caulking - prime and recaulk with appropriate material
- joint retooling may be necessary to accommodate excessive expansion movement.

**COST FACTORS:**
- all buildings

**COST:** $4.50/suite per year

Issue Sheet 2.1

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** No Vertical Control Joints
Lack of control joints in masonry walls. Initial hairline cracks can develop in first year. More significant cracks may take three years to develop depending on quality of masonry units.

**SYMPTONS:** Vertical cracks develop at corners of building and at corners of window and door openings in masonry walls.

**IMPLICATIONS:** If cracks are not sealed water can enter and subsequent freeze thaw action can cause serious break up of the outer wythe of the masonry.

**ACTION:** A minimal repair would simply be to apply an elastomeric sealer over the cracks. This would only serve as an interim temporary repair. A more positive approach would be to replace the cracked units, building in a vertical control joint which is left free of mortar but which is filled with a proper joint filler and sealed with an elastomeric caulking compound.

**COST FACTORS:** 80% of building stock

**COST:** \$500./8 lin. ft. = \$62.50/lin. ft.

Issue Sheet 2.2

APPENDIX: COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** No Horizontal Control Joints
Lack of horizontal control joints below shelf angles at floors of multi storey buildings.
Signs of distress may not be apparent before three to five years after completion depending on creep characteristics of concrete frame and expansion characteristics of masonry units.

**SYMPTONS:** Spalling and cracking of face bricks in courses immeditely above and below shelf angles. At times bulging of the face brick at the angle may also tend to develop in association with ice lensing between the shelf angle and the face bricks.

**IMPLICATIONS:** Initially the condition is cosmetic but if not remedied complete panels of masonry have been known to fall from buildings.

**ACTION:** Rebuild the affected courses of face bricks introducing an open horizontal joint below the shelf angle which is subsequently packed with polyurethane rope and sealed with an elastomeric caulking.

**COST FACTORS:** 80% of building stock

**COST:** \$800./30 lin. ft. = \$27./lin. ft.

Issue Sheet 2.3

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Cracks in masonry and concrete parapets.
Generally become apparent after one to two years.

**SYMPTOMS:** Vertical cracks at intervals along the length of the parapets and diagonal cracks near the corners of the building where the parapets change direction.

**IMPLICATIONS:** If not corrected the masonry parapets in particular can suffer serious damage which could result in a total break up of same.

**ACTION:** Introduction of control joints at fifteen feet centres and expansion joints at thirty feet centres and possible reworking of the coping and the back flashing detail on the parapets.

**COST FACTORS:** 20% of buildings

**COST:** $130./suite

Issue Sheet 2.4

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Lack of sufficient masonry ties
Problems become noticeable after three to five years depending on creep characterisitics of concrete frame and relative behaviour of inner and outer masonry wythes.

**SYMPTONS:** Cracking and bowing or bulging of outer masonry wythe.

**IMPLICATIONS:** Initially the problem is primarily cosmetic unless it occurs in bearing walls, however, if not corrected masonry units could fall from the walls.

**ACTION:** Where units are veneered to concrete elements resin bonded stainless steel ties can be installed to anchor the outer wythe back to concrete elements if the alignment of the wall has not been seriously affected. Where block units have been used as the inner wythe mechanial anchors must be fastened to the inner wythe and set into the mortar joints of the outer wythes in conjunction with the replacement of outer wythe units at intervals related to the tie spacing both horizontally and vertically.

**COST FACTORS:** 10% of building surface area

**COST:** $4./sq. ft.

Issue Sheet 2.5

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Missing Shelf Angles
Shelf angles missing or not being carried around corners. Problems develop after three to five years.

**SYMPTONS:** Vertical crack in masonry in line with the termination end of the angle.

**IMPLICATIONS:** Cracks can open to the point of permitting water to enter. Subsequent freeze thawing can widen the crack causing bricks to become displaced.

**ACTION:** Cut open masonry; install proper shelf angles with self drilling bolts or wedge anchor bolts.

**COST FACTORS:** 2% of all shelf angles

**COST:** $35./lin ft.

Issue Sheet 2.6

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Shelf Angles Not Anchored
Bolts not installed in adjustable anchors to secure shelf angles, or nuts not torqued on bolts, or oversized holes cut into vertical leg of shelf angle.
Problems may not be noticed for three to five years.

**SYMPTONS:** Cracking and spalling bricks in courses immediately above and below the angles' horizontal legs. May also develop bulge in wall.

**IMPLICATIONS:** Initially a cosmetic problem which if not corrected could result in the panel of masonry above the shelf angle becoming unstable.

**ACTION:** Open the wall at the location of the bolts, torque loose nuts, weld washer plates at oversized holes and torque the nuts. Where bolts are missing drill hole in angle and into edge of concrete slab and install a 3/4" diameter wedge anchor.

**COST FACTORS:** 5% of all shelf angles

**COST:** $27./lin. ft.

Issue Sheet 2.7

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Improper Shelf Angle Bearing
Shelf angle not bearing properly on irregular edge of concrete slab. Problems may take three years or more to become apparent.

**SYMPTONS:** Cracking and spalling of brick at horizontal leg of shelf angle. May also develop bulge in wall.

**IMPLICATIONS:** Initially cosmetic, may develop to an unstable condition.

**ACTION:** Open wall at shelf angle install adequate and substantial area steel shim plates to replace pieces of wood fragments that are often found in such conditions used to pack the irregular void at the back of the veritical leg of the angle.

**COST FACTORS:** 10% of shelf angles
50% of buildign stock

**COST:** $3./lin. ft.

Issue Sheet 2.8

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Weep Holes at Shelf Angle

- missing or clogged
- cast iron weepers corroded shut

**SYMPTONS:**

- mortar disintegrating and 'blown out' above shelf angle
- spalling above self angle

**IMPLICATIONS:**

- major brick replacement is difficult due to trying to match brick
- shelf angle corrodes - especially at connections
- expensive labour intensive work

**ACTION:**

- minor - make open vertical joints along shelf angle if damage is minimal
- major - excessive damage necessitates brick replacement

**COST FACTORS:**

- 45% of building stock

**COST:**

- $5./lin. ft.

Issue Sheet 2.9

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Mortar Droppings in Cavity Walls
Accumulating to impede drainage of water from within cavity. Problems can develop during or after first severe rain storm.

**SYMPTONS:** Dampness on interior; in extreme conditions water flowing in through electrical receptacles. Efflorescence on outside, possible bulging if ice lensing occurs.

**IMPLICATIONS:** Initially could be cosmetic and an annoyance condition; in severe cases where lensing is a problem the wall could in time break up.

**ACTION:** Remove the outer wythe locally; remove the mortar droppings and reconstruct the outer wythe taking extreme care to ensure that the mortar dropping conditon is not repeatd.

**COST FACTOR:** 25% of stock
3% of wall surface

**COST:** $5./sq. ft.

Issue Sheet 2.10

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Spalling at exposed edges of concrete slabs
Generally notice three to five years after construction depending on exposure, cover, and number of freeze thaw cycles.

**SYMPTONS:** Rust stains, cracks on concrete surface and local breaking away of the edge of the slab.

**IMPLICATIONS:** Generally this is cosmetic only.

**ACTION:** Cut the concrete back behind the edge reinforcing steel so as to be able to anchor the steel back into the body of the slab. Clean the steel, apply epoxy coating to same and epoxy bonding agent. Repair concrete using a latex or acrylic modified concrete mixture.

**COST FACTORS:** 2% of slab edges
50% of building stock

**COST:** $25./lin. ft.

Issue Sheet 2.11

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Glazed Brick
- disintegration

**SYMPTONS:**
- glazing falling off due to spalling - moisture movement

**IMPLICATIONS:**
- immediately unsightly
- exposure of softer brick interior causes rapid disintegration

**ACTION:**
- replacement with breathable glazed brick
- complete replacement of brick veneer
- cladding of another form, i.e. metal sealing

**COST FACTORS:**
- 50% of buildings built between 1965 and 1975 = 38% of building stock
- 20% of building surface - approximately 80 sq. ft./suite

**COST:** $13./sq. ft.

Issue Sheet 2.12

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Freeze thaw damage to bricks at grade
Generally seven to ten years depending on the quality of the masonry units and the nature of the exposure.

**SYMPTONS:** Staining, splitting, cracking, spalling and general break up of masonry units at grade.

**IMPLICATIONS:** Initially cosmetic unless on bearing walls. If not corrected localized failures could tend to undermine portions of the wall.

**ACTION:** Replace deteriorated brick units and consider parging to a height of at least six inches above grade with a waterproof cementitions latex modified portland cement plaster.

**COST FACTORS:** 15% of building stock
3 sides of building generally affected - approximate 1,600 sq. ft.

**COST:** $13./sq. ft.

Issue Sheet 2.13

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Deterioration of masonry balustrades ramps, stairs, and balconies. Staining and efflorescence can become apparent in first year. Spalling and cracking may not become apparent until after three years or more depending on characteristics of masonry units.

**SYMPTONS:** Efflorescence, cracking of joints, water staining and spalling.

**IMPLICATIONS:** If not corrected the general deterioration will continue until the balustrade is virtually destroyed.

**ACTION:** Generally the problem is one of water penetration and freeze thaw act. Correct coping and back flashing detail; repair joints in masonry by tuck pointing or tape grouting.

**COST FACTORS:** 60% of all buildings

**COST:** $800./suite

Issue Sheet 2.14

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Disintegration of Balcony Slab
- due to poor workmanship
- water penetration into slab causing deterioration of concrete through freeze thaw cycle - corrosion of reinforcing

**SYMPTONS:**
- cracking
- edges crumbling
- spalling at reinforcing

**IMPLICATIONS:**
- eventual balcony failure - hazard to human life
- unsightly - reduces potential for rentability
- moderate costs

**ACTION:**
- patch and graut cracks and spalling
- waterproof coating
- if structural integrity questionable - major replacement

**COST FACTOR:**
- 65% of building stock

**COST:**
- $560./suite

Issue Sheet 2.15

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Balcony Railings
- structural failure of steel railings

**SYMPTONS:**
- loosening of connections at wall and balcony slab
- obvious corrosion of metal inserts in concrete
- obvious corrosion of welds or connector to metal inserts
- tendency of railing design to retain water

**IMPLICATIONS:**
- hazardous to safety of occupant
- excessive exposed rust - unsightly
- moderate costs

**ACTION:**
- repair or replace metal connectors, inserts etc.
- protect all metal parts against corrosion
- redesign and rebuild railings to not retain water

**COST FACTORS:**
- 50% of building stock

**COST:**
- $800./suite

Issue Sheet 2.16

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Cantilevered Steel Joist Balconies

- deflection and deterioration of slab
- water penetration corroding reinforcing steel

**SYMPTONS:**

- obvious deflection
- cracking at wall and slab junction
- deterioration of slab - spalling of top and soffit of slab

**IMPLICATIONS:**

- unsightly appearance
- potential balcony collapse
- moderate costs

**ACTION:**

- break out spalled areas
- repair reinforcing
- patch concrete
- apply protective waterproofing

**COST FACTORS:** 35% of building stock

**COST:** $600./suite

Issue Sheet 2.17

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Cantilevered Wooden Balconies
- collapsing due to wood rot

**SYMPTOMS:**
- unprotected wooden joints
- untreated wood
- obvious wood rot

**IMPLICATIONS:**
- human safety
- incurs damage to rest of building
- expensive and difficult to replace
- major costs

**ACTION:**
- add galvanized flashing to protect joists
- replace deck with pressure treated wood
- maintain with paint/wood preservatives
- replacement of structural members were necessary using treated wood

**COST FACTORS:** 50% will require replacement
1% of building stock

**COST:** $600./suite

Issue Sheet 2.18

APPENDIX: COST ANALYSIS

**CATEGORY:** Structural Integrity

**ISSUE:** Balcony Panel Replacement
- wire glass panels

**SYMPTONS:**
- breakage/cracking

**IMPLICATIONS:**
- occupant safety
- unsightly
- moderate costs

**ACTION:**
- replacement as required

**COST FACTORS:** 5% breakage/year
10% of building stock

**COST:** $250./suite

Issue Sheet 3.1

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Electrical Main Service
User demands increasing

**SYMPTONS:** Overloading
Inadequate power available to suit current user needs

**IMPLICATIONS:** Addition of window air conditioners and extra appliances
Kitchen wiring inadequate for latest requirements
Ground fault protection addition to main service by C.E.C. after 1977
Fire hazard

**ACTION:** Upgrade services to include loading for air conditioner.
Provide ground fault protection for services larger than:

- 1000 AMP, with phase to phase voltage less than 750V and phase to ground more than 150V
- 2000 AMP with phase to ground voltage rated 150V or less

**COST FACTORS:** 75% of building stock

**COST:** upgrading $50,000./building. Ground fault protections $25,000.

Issue Sheet 3.2

APPENDIX: COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Electrical Branch Feeders
- changing user demands - extra appliances
- inadequate capacity

**SYMPTONS:** Overloading
Inadequate power available to suite current user needs

**IMPLICATIONS:** Addition of window air conditions and extra appliances
Kitchen wiring inadequate for latest requirements
Hazardous

**ACTION:** Upgrade branch feeder risers to include loading for air conditioner. Rewire kitchen receptacles installed prior to 1967

**COST FACTORS:** 75% of building stock

**COST:** $700./suite

Issue Sheet 3.3

APPENDIX: COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Aluminum conductors
(Improper terminations against the phenomena of 'Cold Flow')

**SYMPTONS:** High maintenance
Failure, Photo Scan

**IMPLICATIONS:** Buildings constructed between 1965 to 1975, approximately 60% all buildings.

**ACTION:** Replace all mechanical terminations with high compression connectors (lugs).
Replace with copper conductors where high compression connectors become impracticable.
Aluminum bus duct and feeders to be inspected for loose or overtight connection annually.

**COST FACTORS:** 60% of building stock

**COST:**

| | |
|---|---|
| Replace terminations | $ 200./suite |
| Replace conductors | $2,000./suite |
| Inspections | $ 500./building |
| | $ 70./suite |

Issue Sheet 3.4

APPENDIX: COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Inadequate Exterior Lighting

**SYMPTONS:** Inadequate, Broken, Susceptable to Vandalism
High energy, high maintenance

**IMPLICATIONS:** Most buildings prior to 1980

**ACTION:** Install energy conserving, high pressure, sodium exterior fixtures

**COST FACTORS:** 75% of building stock affected

**COST:** $ 500./wall unit (average of 6)
$1,000./pole unit (average of 4)

Issue Sheet 3.5

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Natural Gas Generator
- it is recommended that gas generators be converted to diesel

**SYMPTONS:** 1965-1975 - 38% of building stock
10% with natural gas generators

**IMPLICATIONS:** Source of fuel may be shut off

**ACTION:** Replace with diesel fuel generator set for installations after 1970

**COST FACTORS:** 4% of building stock is affected

**COST:** $20./suite

Issue Sheet 3.6

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Failure of steel fire tube boilers

**SYMPTONS:** High repair costs

**IMPLICATIONS:** Building age:
1950-1955 - 100%
1955-1960 - 100%
1960-1965 - 100%
1965-1970 - 75%
1970-1975 - 25%
1975-1982 - 0%

**ACTION:** Replace with modern water tube forced draft boilers.

**COST FACTORS:** 35% of building stock
replace all over 20 year period

**COST:** boiler replacement $80,000./boiler
maintenance - $13./suite/year

**APPENDIX:** COST ANALYSIS Issue Sheet 3.7

**CATEGORY:** Building Systems

**ISSUE:** Maintenance of Copper tube boilers (gas-fired)

**SYMPTONS:** High maintenance costs

**IMPLICATIONS:** Most buildings between 50 and 100 suites built between 1960 and 1982
90% of all buildings built after 1975

**ACTION:**
Repair Refractory - Every 5 years
Chemically Flush - Every 5 years
Replace Heat Exchangers - Every 10 years

**COST FACTORS:** 40% of building stock

**COST:**
Heat exchangers - $2,500. evry 10 years
Flush and Repair - $ 500. every 5 years

Issue Sheet 3.8

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Copper Tube Boilers (Gas-Fired)

- low efficiency
- due to limited designed capacity

**SYMPTONS:**

- high operating cost with low heat output compared to other systems.

**IMPLICATIONS:** Most buildings between 50 and 100 suites built between 1960 and 1982

**ACTION:** Add stack heat reclaimers

**COST FACTORS:** 40% of building stock

**COST:** $600./suite

Issue Sheet 3.9

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Replacement Piping - Domestic Hot Water
- galvanized piping
- poor installation
- inadequate capacity

**SYMPTONS:** Leaking Hot Water Mains

**IMPLICATIONS:** Applicable to 50% of buildings constructed prior to 1975

**ACTION:**
Buildings over 20 years old - Already renovated
Buildings over 15 years old - 50% already renovated
Buildings over 10 years old - 25% already renovated
Buildings over 5 years old - Most already copper

**COST FACTORS:** replace 40% of building stock

**COST:** $450./suite

Issue Sheet 3.10

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Electric Hot Water Heaters

**SYMPTONS:** High Operating Costs
high maintenance costs (elements corroded)
often fall short of peak demand

**IMPLICATIONS:** 50% of all buildings

**ACTION:** Upgrade Equipment
replace with gas-fired equipment

**COST FACTORS:** 50% of all buildings - replace once

**COST:** $100./suite

Issue Sheet 3.11

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Isolating Valves - Heating
- regular replacement required
- usually done on a demand basis

**SYMPTONS:** Valves seized
valves not closing tightly

**IMPLICATIONS:** Age of building - 10 years - replace 15%
Age of building - 15 years - replace 30%
Age of building - 20 years - replace 70%

**ACTION:** Replace with ball and butterfly valves to service equipment and allow sections of building to be isolated

**COST FACTORS:** Assume all valves will be replaced once in 20 years - 75% of building stock is heated hydronically

**COST:** $180./suite

Issue Sheet 3.12

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Isolating Valves - Domestic Hot/Cold Water
- regular replacement required
- usually done a demand basis

**SYMPTONS:** Seized valves
Valves do not close off

**IMPLICATIONS:** Age of building - 5 years - replace 25%
Age of building - 10 years - replace 50%
Age of building - 15 years - replace 75%
Age of building - 20 years - replace 100%

**ACTION:** Replace with ball valves

**COST FACTORS:** Assume 50% of valves will be replace once in 20 years

**COST:** $170./suite

Issue Sheet 3.13

**APPENDIX** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Plumbing Brass Deterioration
- general wear and inferior design

**SYMPTOMS:** Deterioration of White Metal
Broken plastic
Leaky washers

**IMPLICATIONS:** Buildings - 1950-1960 - replace 100%
1960-1965 - replace 75%
1965-1970 - replace 50%
1975-1980 - replace 10%

**ACTION:** Replace with washerless fittings

**COST FACTORS:** Replace all building stock once in twenty years

**COST:** $360./suite

Issue Sheet 3.14

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building System

**ISSUE:** Ventilation (Corridor Supply)
- basic undersizing of equipment
- lack of maintenance limits the capacity

**SYMPTOMS:** Ineffective ventilation of corridors
Stagnant air

**IMPLICATIONS:** 25% of buildings are affected

**ACTION:** Upgrade equipment

**COST FACTORS:** 25% of building stock, once every 10 years

**COST:** $1,000./building

Issue Sheet 3.15

**APPENDIX:** **COST ANALYSIS**

**CATEGORY:** Building Systems

**ISSUE:** Ventilation (Corridor Supply)

**SYMPTONS:**

**IMPLICATIONS:** All buildings

**ACTION:** Balance system
Change filters

**COST FACTORS:** All building, once a year

**COST:** $10./suite/year

Issue Sheet 3.16

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Ventilation (Individual Suite Exhaust)

**SYMPTONS:** Persistent odours
Condensation problems
Inadequate exhaust

**IMPLICATIONS:** 1950-1960 - 25% of buildings
1960-1970 - 50% of buildings
1970-1982 - 90% of buildings

**ACTION:** 25% of exhaust equipment requires upgrading

**COST FACTORS:** Average of 70% of building stock

**COST:** $400./suite

Issue Sheet 3.17

| | |
|---|---|
| **APPENDIX:** | COST ANALYSIS |
| **CATEGORY:** | Building Systems |
| **ISSUE:** | Cooling (Central Systems) |
| **SYMPTONS:** | Contaminated condenser water<br>Contaminated drain lines<br>Condensation of chilled water lines<br>General maintenance |
| **IMPLICATIONS:** | Generally buildings over 100 suites<br>Buildings - 1950-1960 - 2%<br>1960-1970 - 25%<br>1970-1982 - 40% |
| **ACTION:** | Maintenance of chillers and cooling towers<br>Cleaning of drain lines<br>Up-grading of insulation |
| **COST FACTORS:** | Average of 30% of building stock<br>Once every 10 years |
| **COST:** | $250./suite |

Issue Sheet 3.18

APPENDIX: COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Cooling (Incremental)

**SYMPTONS:** Unit Breakdowns
General maintenance

**IMPLICATIONS:** 25% of buildings between 1970 and 1982
Represents 10% of building stock

**ACTION:** Allow 5% replacement and maintenance

**COST FACTORS:** 10% of building stock
5% replacement and maintenance/year

**COST:** $43./suite/year

Issue Sheet 3.19

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Building Systems

**ISSUE:** Cooling (Incremental and Window Units)

**SYMPTONS:** Air and water leakage - sleeve and unit

**IMPLICATIONS:** 25% of buildings between 1970 and 1982
Represents 10% of actual building stock

**ACTION:** Caulk and seal

**COST FACTORS:** 10% of building stock
Once every 10 years

**COST** $400./suite

Issue Sheet 4.1

| | |
|---|---|
| APPENDIX: | COST ANALYSIS |
| CATEGORY: | Parking Structures |
| ISSUE: | Landscaped Garage Roof Slab - Leaking<br>- due to imperfect water proofing<br>- cracking due to excessive soil loading |
| SYMPTONS: | - water leakage<br>- calcium deposits on underside<br>- spalling of underside of slab |
| IMPLICATIONS: | - leaking water - unacceptable environment<br>- electrical hazard<br>- structural failure<br>- major costs |
| ACTION: | - re-waterproofing of slab<br>- reduction of soil depth<br>- structural repairs i.e. stiffening beams<br>- addition of shear walls or columns if necessary |
| COST FACTORS: | 50% of all parking slab surfaces |
| COST: | Soil removal and landscaping - $600./car<br>Waterproofing $11./car |

Issue Sheet 4.2

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Water penetration through roof slabs
- generally three to five years after construction
- lack of proper drainage

**SYMPTONS:** Cracks on soffit of slabs become wet and show evidence of water coming through after a rain storm. When this occurs under a driveway there is often evidence of salt residue precipitating out of the solution when the water evaporates.

**IMPLICATIONS:** Depending on the aggressive quality of the water there could be significant corrosion developing on the reinforcing steel which in time will adversely affect the structural integrity of the slab. Freeze thawing could also present additional problems where the water becomes entrapped developing disruptive forces on freezing.

**ACTION:** Where the condition is not too extensive flexible epoxy can be injected to seal the cracks. Where the condition is extensive the paving or overburden above should be removed and a new waterproof membrane applied. In addition to the new membrane additional drains will also be required.

**COST FACTORS:** 3 drains/buildings before 1970 - 50% of building stock

**COST:** $1,200./drain

Issue Sheet 4.3

| | |
|---|---|
| APPENDIX: | COST ANALYSIS |
| CATEGORY: | Parking structures |
| ISSUE: | Lack of traffic bearing membranes<br>Problem becomes apparent three to five years after completion. |
| SYMPTONS: | Surface pitting, cracking and minor spalling |
| IMPLICATIONS: | If left untreated the symptoms can become more aggravated resulting in major spalling and delamination of the concrete surface which can in turn lead to a serious loss of strutural integrity. |
| ACTION: | If treated early various concrete sealers can be applied after some minor patching is carried out using special concrete repairing compounds. Sealers have to be reapplied periodically depending on the type of sealer and the degree of traffic flow. This may only serve to deal with the problem for a limited number of years after which more extensive repairs may be required. |
| COST: | $600./car |

Issue Sheet 4.4

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Garage floor slab deterioration where not protected by membranes.
The problem begins in the first winter, however, it often takes at least three to five years before significant damage becomes apparent depending on the quality of the concrete and the amount of traffic.

**SYMPTOMS:** Cracks, scaling, pitting, spalling and delamination of concrete surface over top reinforcing layers.

**IMPLICATIONS:** The cracking and spalling is related to the corrosion products developing on the surface of the rusting top layers of reinforcing steel.
If left unchecked the deterioration of both the concrete and the steel can advance to the point where the structural integrity of the slab can be seriously reduced.

**ACTION:** After installing an adequate temporary shoring system all delaminated and deteriorated concrete should be removed. The reinforcing steel should be cleaned off, all rust and additional steel placed if required. After the steel is thoroughly cleaned and all deleterious material is removed from the sound concrete, apply epoxy coating to the steel reinforcing and epoxy bonding agent to the parent concrete; then fill the cut out out area with high cement content low slump concrete which is compatible with the parent concrete; cure concrete in a controlled manner to minimize shrinkage and maximize strength gain of the concrete.

**COST FACTORS:** 90% of slabs are affected

**COST:** $150./car

Issue Sheet 4.5

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Deterioration at soffit of concrete slab.
Generally takes five to seven years before damage becomes apparent.

**SYMPTONS:** Localized spalling and cracking at the bottom of slabs.

**IMPLICATIONS:** The deterioration is generally the result of water entering the top surface at a crack which penetrates through the thickness of the slab to the bottom where it encounters the bottom reinforcing initiating corrosion of same. If left unchecked the corrosion of the steel and the deterioration of the concrete can seriously reduce the integrity of the slab.

**ACTION:** Provide adequate shoring along both sides of the crack and cut back through the full depth of the slab both sides of the crack over a width sufficient to expose the corroded reinforcing steel. Clean the steel and strengthen same if required, by welding addition bars or splicing same. After coating steel with epoxy and applying an epoxy bonding agent cast concrete into the cut. The concrete shall have high cement content, low low slump and be compatible with the original concrete in the slab; provide effective controlled curing.

**COST FACTORS:** 80% of all soffits

**COST:** $80./car

Issue Sheet 4.6

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Ponding of water on slab surfaces
Generally an immediate built in efect may develop after several years as a result of creep and deflection if drains not located at mid spans.

**SYMPTOMS:** Water collects on surface of slab and does not flow to drains. When it evaporates there is often evidence of salt residue at the perimeter of the ponding.

**IMPLICATIONS:** The concrete becomes saturated at these locations and subsequent freezing can tend to cause pitting and spalling.

**ACTION:** The surface should be scarified and a bonded cementitious topping should be applied to create proper slopes to drains. Chases should not be cut into the slab to channel the flow of water to drains.

**COST FACTORS:**
- assume 6 drains required by average building
- 55% of building stock

**COST:** $1,200./drain

Issue Sheet 4.7

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Expansion joint deterioration
Spalling, splitting, cracking, and general deterioration of ledges and haunches at expansion joints.
This matter often takes three to five years before deterioration becomes apparent.

**SYMPTONS:** Cyclic movements, sometimes combined with water penetration, at expansion joint supports where sliding bearings have not been introduced causes a breaking up of the concrete on these elements. Initially the signs may be simple slight spalling and cracking which if not remedied can deteriorate to a total break up of the element.

**IMPLICATIONS:** If the deterioration is not repaired early the support of the slab, or beam, bearing on the ledge or haunch, respectively, could be lost and there could be a significant failure in the framing system.

**ACTION:** Jack up the beam or slab and introduce sliding bearing assemblies, then repair the ledge or haunch employing latex or acrylic concrete in conjunction with appropriate bonding agents. Where deterioration is advanced, temporarily support the slab or beam, rebuild the haunch or introduce specially designed steel bearing assemblies, then introduce the sliding bearings before removing the temporary supports.

**COST FACTORS:** 75% of garages are affected
Assume 100 ln. ft. are affected

**COST:** $200./lin. ft. - beam repair
$32./lin. ft. - resealing

Issue Sheet 4.8

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Vertical cracks in concrete foundation walls

- resulting from a lack of adequate control joints
- can be noticed in first year after construction, if not immediate

**SYMPTONS:** Cracking on the interior exposed face of the wall sometimes associated with water penetration

**IMPLICATIONS:** If cracks are not well below grade and the water does not drain from same, freezing and thawing cycles could cause a local breaking up in the wall at the cracks.
Buildings before 1970

**ACTION:** After shrinkage of the concrete has essentially fully developed and the water has drained out of the crack, pressure inject the crack with expoxy to fully seal and bond the faces of the crack.

**COST FACTORS:**

- 55% of building stock
- assume 100 ln. ft. of cracking

**COST:** $15./lin. ft.

Issue Sheet 4.9

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Heated Parking Ramps

- both gycol and electrical resistance systems subject to breakdown due to water penetration and subsequent corrosion
- high energy consumption if controls are inadequate.

**SYMPTONS:**

- cracked slab
- gycol leakage
- snow accumulation - system not operable.

**IMPLICATIONS:**

- unsafe ramp conditions
- costly to repair
- excessive energy consumption

**ACTION:**

- replacement of defective heating elements with corrosion resistant elements
- replacement of ramp with removable paving system for easy of access to treating elements.

**COST FACTORS:** 75% of all ramps will have to be replaced

**COST:**

| | |
|---|---|
| - electrical | - $13,000. |
| - Glycol | - $20,000. |
| - New concrete topping | - $ 3,000. |
| - Paver system | - $15,000. |

Issue Sheet 4.10

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Garage ramps
- heating medium - glycol in plastic pipes
  - electric heat

**SYMPTONS:**
- breaks in concrete
- inoperative - snow accumulation

**IMPLICATIONS:** 25% of all buildings

**ACTION:** Surface maintenance necessary
Routine cleaning will reduce surface wear and breaks

**COST:** $500./ramp/year

Issue Sheet 4.11

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Inadequate Lighting in Parking Garage

- dirt accumulation
- mimimalist design
- low reflectance levels

**SYMPTONS:**

- unpainted surfaces
- illumination level low
- illumination uneven

**IMPLICATIONS:**

- unsafe
- parking garages are high crime areas - low lighting is conclusive to this
- unpleasant environment
- moderate costs

**ACTION:**

- change over to fluorescent fixtures - increased number of fixtures
- greater illumination of exists
- paint surfaces light reflective colour (at least the ceiling)
- regular cleaning maintenance

**COST FACTORS:**

- painting 100% of building stock - once every 10 years
- lamp change 60% of building stock

**COST:**

- painting $160./car
- lamp change $160./car

Issue Sheet 4.12

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Parking Structures

**ISSUE:** Wet sprinkler systems in garages
- garages must be heated to prevent freezing sprinkler pipes

**SYMPTONS:**

**IMPLICATIONS:** Applies to all buildings constructed prior to energy crunch (prior to 1978) - 85% of building stock - 50% already converted

**ACTION:** Could be converted to dry systems to allow lower heat level in garages.

**COST FACTORS:** Applies to 42% of building stock

**COST:** $140./car

Issue Sheet 5.1

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Occupant Safety

**ISSUE:** Emergency Power
required for lighting, fireman's elevator, emergency voice, communications system

**SYMPTOMS:**

**IMPLICATIONS:** Building codes upgraded at various times. After 1970, fire booster pump to be on emergency power, N.B.C. After 1975, introduction of high rise measures, N.B.C. fireman's elevator to be on emergency power. Stair shaft, fireman's elevator shaft pressurization fans on emergency power.

**ACTION:** Provide emergency power via motor generator power plant, to operate equipment required by the high rise building measures, N.B.C.

**COST FACTORS:** Building built before 1975 - 75% of building stock

**COST:** $1,200./building
$10,000./building with fireman's eleavtor

Issue Sheet 5.2

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Occupant safety

**ISSUE:** Emergency lighting

**SYMPTONS:**
- inadequate due to code change
- limited battery life

**IMPLICATIONS:** Building codes up-grade at various times prior to 1970
Battery lighting only required

**ACTION:** Battery lighting system to be replaced at intervals, every 10 years.

**COST FACTORS:**
- battery life - 10 years - replace twice in 20 years
- 50% of building stock

**COST:** $35./suite

Issue Sheet 5.3

APPENDIX: COST ANALYSIS

CATEGORY: Occupant Safety

ISSUE: Smoke alarm - dwelling unit

SYMPTONS:

IMPLICATIONS: None provided for buildings prior to 1979. 1979 Ontario introduction of smoke alarm detectors to be installed in each dwelling unit.

ACTION: Retrofit and provide smoke alarm detector in each dwelling unt.

COST FACTORS:
- prior to 1979 - 85% of building stock
- assume 70% not retrofitted

COST: $50./suite

Issue Sheet 5.4

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Occupant Safety

**ISSUE:** Fire alarm system
- become obsolete
- lack of maintenance or testing

**SYMPTOMS:** Failure of system during testing or in an emergency

**IMPLICATIONS:** Poor maintenance
Building code up grade at various times
1980 N.B.C requires automatic heat detector in each new dwelling unit
1977 N.B.C requires annunciation of sprinkler and F.H.C. standpipe valve supervision

**ACTION:** Replace battery stand-by source in fire alarm control panel at intervals of every 10 years
Retrofit and provide sprinkler, F.H.C. standpipe, valve supervision and annunciation

**COST FACTORS:** Buildings built before 1977 - 85% of building stock
- assume 75% require replacement

**COST:** $1,200./building
$ 100./suite

Issue Sheet 5.5

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Occupant Safety

**ISSUE:** Fireman's elevator
(not installed prior to 1975)

**SYMPTONS:**

**IMPLICATIONS:** Could be required to be added to all apartment buildings over 60 feet in height, built prior to 1975

**ACTION:** Fireproofing
Smoke pressurization
Emergency power
Key control

**COST FACTORS:** 75% of building stock

**COST:** $40,000./elevator

Issue Sheet 5.6

| | |
|---|---|
| **APPENDIX:** | COST ANALYSIS |
| **CATEGORY:** | Occupant Safety |
| **ISSUE:** | Emergency Voice Communication System<br>- means for firefighters to communicate with occupants in their suites<br>- pending code requirements will make them mandatory in next 20 years |
| **SYMPTOMS:** | |
| **IMPLICATIONS:** | Building code up-grade requirement for high buildings after 1975, for buildings of 12 stories or 120 feet in height. None provided for all buildings prior to 1975. |
| **ACTION:** | Retrofit and provide E.V.C. system in buildings of 12-storey and higher, or 120 feet in height. |
| **COST FACTORS:** | 95% of building stock |
| **COST:** | $240./suite |

Issue Sheet 5.7

APPENDIX: COST ANALYSIS

**CATEGORY:** Occupant Safety

**ISSUE:** Compartmentalization
- means of sealing off suites in 9 buildings to contain fire and smoke

**SYMPTONS:**

**IMPLICATIONS:** Could be required in apartments over 60 feet in height, built prior to present codes (prior to 1975)

**ACTION:**
Smoke sealing and fireproofing
Automatic apartment door closers
Smoke pressurization

**COST FACTORS:** 85% of building stock

**COST:**
Sealing - $100./suite
Door Closers - $150./suite
Pressurization - $300./suite

Issue Sheet 6.1

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Movement Systems

**ISSUE:** Elevator Vandalism
- general vandalism by children
- mechanisms not fool proof or secure
- children use elevator as form of toy

**SYMPTOMS:**
- defacement of interior panels
- destruction of controls

**IMPLICATIONS:**
- frequent breakdown
- dangerous because of malfunctioning
- inconvenience to residents
- low to moderate costs

**ACTION:**
- durable surfaces that can be replaced
- superintendant's monitor of operation
- security access into operational mechanisms

**COST FACTORS:** all high rise buildings

**COST:** $2,400./year/building

Issue Sheet 7.1

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Equipment & Fitments

**ISSUE:** Countertops
- replacement due to wear
- replacement due to burns

**SYMPTONS:**
- burn marks
- damaged counter tops

**IMPLICATIONS:**
- unsightly kitchen
- rentability difficult due to appearance
- low costs

**ACTION:**
- ongoing maintenance program - allowance for regular replacement
- built-in hot pad adjacent stove
- built-in cutting board adjacent sink

**COST FACTORS:** All buildings - once every 20 years

**COST:** $150./suite

Issue Sheet 7.2

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Equipment & Fitments

**ISSUE:** Kitchen Cabinet Repair & Replacement
- due to wear and abuse
- upgrading substandard forms i.e. without doors

**SYMPTONS:**
- broken hinges
- obvious wear
- damaged surfaces

**IMPLICATIONS:**
- rentability affected by unsightliness
- low costs of repair

**ACTION:**
- repair and replacement as required

**COST FACTORS:**
- repair once every 10 years
- replace once every 20 years
- 100% of building stock

**COST:** Repair - $300./suite
Replace - $1,600./suite

Issue Sheet 7.3

APPENDIX: COST ANALYSIS

**CATEGORY:** Equipment & Fitments

**ISSUE:** Retiling of Bathrooms
- due to improper substrate material

**SYMPTONS:**
- grant and tile failing
- unsightly
- mold

**IMPLICATIONS:**
- water penetration into walls
- leakage to floor below
- unsightly
- moderate ongoing costs for repair

**ACTION:**
- reinstall or replace tiles
- replace substrate material
- regrant
- check ventilation - up grade

**COST FACTORS** 50% of building stock
once every 10 years

**COST:** $400./suite

Issue Sheet 7.4

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Equipment & Fitments

**ISSUE:** Balcony Door
- balcony screen door replacement
- balcony door replacement
- damage due to high winds and moisture

**SYMPTONS:**
- obvious damage - off hinges
- balcony door warped

**IMPLICATIONS:**
- limited use of balcony
- hinders rentability of unit

**ACTION:**
- replacement of screen door with auto closer
- replacement of balcony door with exterior grade insulated steel door

**COST FACTORS:** 5% breakage/year, 10% of balconies

**COST:** $250./suite

# APPENDIX B

## Description and Cost Analysis Issue Sheets for Other Conservation and Maintenance Items

This appendix contains general comments and some cost analysis issue sheets for categories of issues not considered for the purposes of this study to be conservation items. These categories include: energy conservation, appearance and aesthetics, site development and amenity package.

## Energy Conservation

This is a very large and timely subject. In the context of this study certain items were probed as they related to building conservation. It was beyond the scope of this study to examine and comment on energy conservation in the larger sense.

Certain basic kinds of maintenance/conservation interventions were identified as major activities which had impact on energy conservation. These included:

- maintenance to existing boilers to achieve maximun efficiency
- adequate control systems particularly controls which zone the parts of the building as they are in shade or in sun
- night set back controls on those parts of the building systems which could benefit, such as corridor make-up air
- control and reduction of air infiltration and exfiltration
- control of ramp snow melting equipment
- addition of water saving devices
- control and scheduling of domestic water system temperatures
- substitution of fluorescent lighting in garages, corridors, washrooms and kitchens.

Many of the above items are currently being retrofitted into various buildings and are showing sizable operating benefits. Some service companies and manufactures have made this a major effort.

When equipment is replaced or upgraded, most property managers are making sensible decisions about selecting energy effective equipment. Similarly, sensible decisions are being made about increasing roof insulation when opportunities for doing so occur.

Cost analysis issue sheets 1 to 10 deal with issues of energy conservation.

## Appearance And Aesthetics

There are no major maintenance/conservation items identified under this heading. There are obvious ongoing items which affect building appearance and which are cost items. However these are all viewed as being ordinary and ongoing maintenance works. Certain items of major repair work to exterior balcony railings are referred to in the section titled 'Structural Integrity'.

Included in the ordinary work of ongoing maintenance are such items as; exterior painting to trim, flashings, doors which require painting, repairs to entrances and entrance screens, etc. Included also are replacement of major interior finishes in public areas such as carpeting and wall covering in corridors, special finishes and furniture in lobbies and lighting of interior common spaces. Most building management people provide budget allowances for these works and do not view them as extraordinary charges.

The interior as well as the exterior finishes of a building can be the subject of vandalism. Repair of damage as a result of vandalism is regarded as a major expense. Carpeting has been cut, burned and stained. Large areas of vinyl wall covering can be torn from corridor walls. Furniture not bolted down (and even some which is bolted down) vanishes from lobbies. Some of the expense of vandalism is covered by insurance, however, premiums for such insurance can be high, and some building managers simply treat vandalism as an unfortunate, unpredictable, but costly charge.

Cost analysis issue sheets 10 to 12 deal with issues of appearance and aesthetics.

## Site Development

The needs for major interventions to maintain/conserve the exterior improvements of the site were regarded by the industry with some wide ranging and diverse opinion. There is, on the one hand, the general view that ordinary maintenance measures were sufficient to preserve the exterior improvements. Others were of the opinion that major efforts were required. The adequacy of the original design and installation of the landscape elements, both green and hard, was most often given as the major source of ongoing costs.

Green landscaping is by its very nature an ongoing maintenance requirement. Grass must be regularly cut, weeds controlled, fertilizer applied, and so on. Small size tree material is subject to considerable abuse simply because it cannot resist the ravages of active play or casual vandalism. Decorative planting and shrubs also demand regular attention to feeding, pruning and weeding. Costs for these works vary widely. Opinions were consistent that maintenance of initial landscaping was a form of ongoing improvement of the property and is generally well carried out by the industry.

Hard elements in site development require regular and often major maintenance/conservation measures. Most commonly noted and observed needs are the repair to curbs, sidewalks, steps, roadways, and parking surfaces. Depending on the intensity of usage and the adequacy of the initial construction, the costs for these items will vary significantly, but in all cases tend to be high. Garden walls, screen fencing, and exterior lighting can also be high cost maintenance/conservation items. In the case of masonry garden walls, the ordinary reason for high maintenance costs is usually a direct result of initial poor and often irresponsible design and construction. Often this is so bad that practically total reconstruction is necessary after only a short time of use. Pole mounted electric lighting is another abuse item. These can be damaged through vandalism to the extent of being torn out of the ground.

Pole lighting over underground garages is often the source of garage roof leaks. There are examples where such pole mounted lighting has been completely removed by building management and replaced with lighting mounted on the face of nearby buildings.

In certain public sector housing projects major redesign/replanting programs are being carried out. The reason given for these major actions is that the initial designs simply did not meet the functional needs of the users. Initial construction economics often place high demands on subsequent expensive ongoing major maintenance works, to both green and hard site improvements.

Plant boxes over parking garages are often the source of garage roof leaks because of initial economies of construction and all too often poor design. Boxes constructed of improperly treated wood timbers rot out and require complete replacement. Boxes constructed of masonry are subject to the same stresses which contribute to the deterioration of garden walls. Deterioration of masonry work, spalling of brick faces and deterioration of masonry joints result from the action of water and frost. Poor wall cap design also contributes to plant box maintenance. Waterproofing and drainage of plant boxes over underground garages is too often casually performed work which contibutes to both roof leaks and to deterioration of the plant box itself. We received reports that certain projects were simply removing all plant boxes rather than face the ongoing problems.

Despite the extent and magnitude of the items related to maintenance/conservation of site development works, the vast majority of multiple housing development sites are well maintained. Site maintenance is obviously regarded as an important matter by both building owners and building managers.

## Amenity Package

All large rental buildings, and some smaller ones have amenity facilities for the shared enjoyment of the residents of the building. In small buildings the amenities may be simple ones, perhaps limited to small play spaces or tot lots for children. As the buildings increase in size and the number of dwelling units increase, the number and extent of the amenities can increase. In large rental projects, the amenities can include indoor and outdoor swimming pools, saunas and change rooms, squash courts, as well as other active recreation facilities. Some large projects include party rooms for adults and game rooms for teenagers. Tennis courts are popular features. In buildings for senior citizens, it is common to provide indoor recreation spaces, craft, library, card and billiard rooms. The amount and extent of these facilities is often influenced by the competiveness of the rental market and the location of the project in relation to recreation opportunities in the adjacent community. With the exception of indoor and outdoor swimming pools and tennis courts, the amenity facilities are not items of major maintenance or of significant conservation cost.

Conventional periodic maintenance is necessary for all the amenity facilities including cleaning, painting, and minor repairs. The high cost elements are the swimming pools and tennis courts. For these items, costs are continuous and high on an annual basis. Tennis court surfaces are fragile, affected both by weather and abuse; the surfaces require annual maintenance in the spring of the year, and may require further treatment throughout the year. Fencing and night lighting for these courts can also require attention. However it is the playing surface itself which is the major cost generator.

Outdoor pools require major annual expense particularly related to annual start-up. Start-up costs for an outdoor pool can be as high as $5,000. a year. Each year the pool must be cleaned after being exposed to dirt and the weather all through the winter. The pool equipment requires annual inspection and service, and often the pool deck space must be repaired. Indoor and outdoor pools require replacement of filter equipment, and while this is regarded as ongoing ordinary maintenance, it can represent a significant cost. Some pools have paint finishes and are painted annually. Over time the paint builds up to such a thickness that it must be completely removed before repainting.

Maintenance actions related to ordinary children's play spaces are not a major factor. In certain projects which are more than 10 years old there is often the need to redesign or completely eliminate these spaces since the original population of small children has grown up and the original play spaces are no longer be appropriate. The costs of these changes can be significant but are not ordinarily predictable.

The age of the building has little to do with the general maintenance/conser-ation costs for items in the amenity package.

Issue Sheet 1

APPENDIX: COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Windows - inadequate thermal value, excessive infiltration.

**SYMPTOMS:**

- interior frosting and excessive condensation
- cold air can be felt
- window caulking or seals visibly deteriorated

**IMPLICATIONS:**

- window frames, sill and casement deteriorates due to condensation
- costly heat loss
- general environmental discomfort

**ACTION:**

- replacement with more thermally resistive windows
- installation of interior storms - less costly than total replacement but much less effective
- recaulking (as part of regular maintenance)
- reduce - window area with infill panels.

Issue Sheet 2

**CATEGORIES:** Energy Conservation

**ISSUE:** Lighting in Corridors
Mostly incandescent

**SYMPTOMS:** Insufficient illumination
High operating costs

**IMPLICATIONS:** All buildings constructed prior to 1980

**ACTION:** Replace incandescent lighting with fluorescent

**COST FACTORS:** 50% of building stock

**COST:** $60./suite

Issue Sheet 3

APPENDIX: COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Lighting in kitchens & bathrooms
- mostly incandescent

**SYMPTONS:** High operating cost

**IMPLICATIONS:** All buildings

**ACTION:** Replace incandescent lighting with fluorescent

**COST FACTORS:** 90% building stock

**COST** $140./suite

Issue Sheet 4

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Inefficient fuels for heating
- oil

**SYMPTOMS:** Excessive heating costs

**IMPLICATIONS:** Less than 5% of buildings

**ACTION:** Convert to gas fuel

**COST FACTORS:** 5% of building stock

**COST:** $250./suite

Issue Sheet 5

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Control of mixed water temperature to hot water heating system
- control of building temperature by controlling water temperature rather than by merely volume of ciruclation

**SYMPTONS:** Building overheating
Fuel costs high

**IMPLICATIONS:** Age of buildings -
5 years old - 10%
10 years old - 20%
15 years old - 50%
20 years old - 100%

**ACTION:** Replace and upgrade mixing controls due to age of condition

**COST FACTORS:** 50% building stock at present
100% of building stock in 20 years
factor 1.5

**COST:** $1,000./building

Issue Sheet 6

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Lack of Individual Apartment Thermostats
- overheating occurs through lack of controls
- no ability for tenant adjustment to preference

**SYMPTONS:** Excess fuel consumption
- tenant discontent

**IMPLICATIONS:** Applicable to following:
Buildings built 1950-1955 - 75%
1955-1960 - 75%
1960-1965 - 75%
1965-1970 - 50%
1970-1982 - 25%

**ACTION:** Add self-contained thermostat valves

**COST FACTORS:** 40% of building stock

**COST:** $70./suite

Issue Sheet 7

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Water conserving devices

**SYMPTONS:**

**IMPLICATIONS:** All buildings

**ACTION:**

- brass, stainless steel or plastic dams in water closets
- flow regulated flush tanks
- flow regulated shower heads
- flow regulated faucets

**COST FACTORS:** All buildings

**COST:** $85./suite

Issue Sheet 8

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Heat Loss Through Ventilation
- large wastage of warm air through ventilation

**SYMPTONS:** High operating cost

**IMPLICATIONS:**
1950-1960 - 75% of buildings
1960-1970 - 50% of buildings
1970-1982 - 10% of buildings

**ACTION:**
Install heat reclaim equipment
Use timers to limit periods of operation
Co-ordinate with corridor make-up air

**COST FACTORS:** 75% of building stock

**COST:** $300./suite

Issue Sheet 9

APPENDIX: COST ANALYSIS

CATEGORY: Energy Conservation

ISSUE: Ventilation (corridor supply) controls
- unnecessary ventilation during low need periods

SYMPTONS: Excessive venting causes energy wastage in heating make-up air

IMPLICATIONS: All buildings

ACTION: Add timers to limit periods of operation

COST FACTORS: 2 supply units/building

COST: $500./supply unit

Issue Sheet 10

**APPENDIX:** COST ANALYSIS

**CATEGORY:** Energy Conservation

**ISSUE:** Automatic Controls for Garage Ramps
- heating medium - glycol in plastic pipes
  - electric heating cable

**SYMPTONS:** Energy wastage during periods of thaw

**IMPLICATIONS:** 50% of all buildings

**ACTION:** Add controls, snow sensing devices and timers

**COST FACTORS:** 50% of building stock

**COST:** $1,000./ramp

Issue Sheet 10

**APPENDIX:** COST FACTORS

**CATEGORY:** Appearance & Aesthetics

**ISSUE:** Two Coat Plastering Disintegrating
- covered with wallpaper vinyl wall covering

**SYMPTONS:**
- separation of finish coat from scratch coat because of shrinkage of wall coating
- occurs mainly in corridors and stairwells

**IMPLICATIONS:**
- failure of expensive wall surface because of substrait
- immediately unslightly

**ACTION:**
- re-drywall damaged surfaces - usually entire corridors

**COST FACTORS:** Buildings prior to 1970 - 55% of building stock
- 20% of buildings are affected

**COST:**
$500./suite
$400./stairwells and halls

Issue Sheet 11

| | |
|---|---|
| **APPENDIX:** | COST FACTORS |
| **CATEGORY:** | Appearance & Aesthetics |
| **ISSUE:** | Balcony Panel Finishes - Paint Popping<br>- basic design problem |
| **SYMPTOMS:** | - paint peeling in large sheets off balcony panels<br>- due to thermal expansion |
| **IMPLICATIONS:** | - continuous year to year maintenance problem<br>- neglect can lead to corrosion of panel |
| **ACTION:** | - continual painting<br>- replacement with prefinished panels |
| **COST FACTORS:** | Painting $50./suite |
| **COST:** | Panel replacement $600./suite |

Issue Sheet 12

**APPENDIX:** COST FACTORS

**CATEGORY:** Appearance & Aesthetics

**ISSUE:** Facade Cleaning
- sandblasting, scrubbing etc.

**SYMPTONS:**
- high level of polutants build up on masonry block, staining and streaking
- unwashed areas - protected from rain tend to accumulate city grime

**IMPLICATIONS:**
- unsightly exterior appearance
- may be a negative determinant in rentability

**ACTION:**
- older buildings in downtown district will require major wash and scrub or sandblasting

**COST FACTORS:** All building stock
once in 20 years

**COST:** $2,400./suite

# APPENDIX C

## Hypothetical Building Costing Notes

## Appendix C: Hypothetical Building Costing Notes

| Reference | Item and Cost |
|---|---|
| | **1. WEATHER PROTECTION** |
| | Flat Roofing Systems |
| Hanscomb | - conventional roof replacement - $320./suite |
| Hanscomb | - annual roof repair - $16./suite |
| C - K&S | - presently 50% of roofs require replacement |
| C, CBD | - roof life - 10-15 years |
| | - replacement factor for next 20 years = 1.5 |
| | 120 suite, 20 year cost = $320. x 120 suites x 1.5<br>+$16. x 120 suites x 20 yr.<br>= $96,000. |
| ing Cadillac | - inverted roof replacement - $400./suite |
| Fairview Roofing | - annual roof repair - $8./suite |
| udy | - replacement factor for next 20 years = 1.0 |
| ns | 120 suite, 20 year cost = $400. x 120 suites x 1.0 + $8. x 120 suites x 20 yrs.<br>= $48,000. + $19,200.<br>= $67,200. |
| | Masonry Walls |
| nscomb | - ongoing repairs (tuck pointing, brick replacement) - $4.00/sq. ft. |
| chetype building | - assume 400 sq. ft. exterior wall surface |
| K&S, Jablonski | - 5% brick replacement 2% brick & block replacement every 3-5 years assume 4 |
| ild stocklist | - 75% of building stock 1960-1980 main sufferers |
| nscomb | - $13./sq. ft. brick replacement |
| K&S, Jablonski | - 5% of wall need repointing every 5 years |
| nscomb | - $4./sq. ft. repointing |
| nscomb | - $21./sq. ft. - brick & block replacement |
| | Cost per suite per 4 years = 400 sq. ft. x 5% x $13./sq. ft. x 75%<br>+400 sq. ft. x 20% x $4./sq. ft. x 75%<br>+400 sq. ft. x 2% x $21./sq. ft. x 75% |
| ib | Cost per suite per 4 years = $195. + $240. + $126. = $560./suite/4 years |
| | 20 year cost for 120 suites apartment building = $560./suite x 120 suites x $\frac{20}{4}$ years<br>= $67,200. |

| Reference | Item and Cost |
|---|---|
| | Masonry (cont'd) |
| Hanscomb | - Cladding $2,300./suite |
| Dist. Sheet | - occurs in 85% of buildings |
| | Cost for cladding 120 suite apartment = $2,300. x 120 x 85% |
| | = $207,000. |
| | Windows |
| Hanscomb | - Storm windows $650./suite |
| Hanscomb | - Thermally resistive windows $2,500./suite |
| | Cost for 120 suite apartment = $650. x 120 |
| | Storm window retrofit = $78,000. |
| | Cost for 120 suite apartment = $2,500. x 120 |
| | Thermal windows = $300,000. |
| Hanscomb | Caulking |
| | - $4.50/suite/year |
| | Cost = $4.50/suite/year x 120 suites x 20 years |
| | = $10,800. |
| | 2. STRUCTURAL INTEGRITY |
| | Shelf Angles |
| | - 120 suite building contains 4,800 lin. ft. of shelf angle |
| Jablonsky | - 2% missing |
| Hanscomb | - $35./lin. ft. to replace |
| | Cost = 4,800 lin. ft. x 2% x $35. |
| | = $3,360. |
| Jablonsky | - 5% not anchored |
| Hanscomb | - $27./lin. ft. to anchor |
| | Cost = 4,800 lin. ft. x 5% x $27. |
| | = $6,480. |
| Jablonsky | - 50% have no control joint |
| Hanscomb | - $27./lin. ft. |
| | Cost = 4,800 lin. ft. x 54% x $27. |
| | = $69,600. |

| Reference | Item and Cost |
|---|---|
| | Shelf Angles (cont'd) |
| Jablonsky | - 50% missing weep holes |
| Hanscomb | - $5/lin. ft. |
| | Cost = 4,800 lin. ft. x 50% x $5. lin. ft.<br>= $12,000. |
| | 10% improper shelf angle bearing<br>$3./lin. ft. |
| | Cost = 4,800 lin. ft. x $3./lin ft. x 10%<br>= $1,440. |
| | Masonry |
| | Control Joints |
| Jablonsky | - assume 50% of buildings without control joints<br>- 640 lin. ft. of jointing required for 120 unit building |
| Hanscomb | - $62./lin. ft. |
| | Cost = 640 lin. ft. x 50% x $62.<br>= $19,840. |
| | Parapets |
| Jablonsky | - 40% of parapets require major repair now and in 10 years |
| Hanscomb | - $130./suite |
| | Cost = $130./suite x 120 suites x 40% x 20 years / 10 years<br>= $12,480. |
| | Grade Damage |
| Jablonsky | - 15% of buildings suffer freeze-thaw damage at grade<br>- perimeter 480 lin. ft. x 5 ft. height on 3 sides |
| Hanscomb | - $13./sq. ft. brick replacement |
| | Cost = 1600 sq. ft. x $13./sq. ft. x 15%<br>= $3,120. |
| | Mortar Blockage |
| Jablonsky | - 25% of buildings have cavity wall blockage - involves 3% of wall surface |
| Hanscomb | - $5./sq. ft. brick removal, cavity clean-out, brick replacement<br>- 120 suite surface area = 384,000 sq. ft. x 75% = 288,000 sq. ft. |

| Reference | Item and Cost |
|---|---|
| | Mortar Blockage (cont'd)<br>Cost = 288,000 sq. ft. x \$5./sq. ft. x 3% x 25%<br>= \$10,800. |
| K&S | Masonry Penthouse Deterioration<br>- 75% of buildings will require major repairs<br>- wall area 1,400 sq. ft.<br>- 30% of wall surface very 10 years<br>- \$13./sq. ft. masonry repair<br>- \$2./sq. ft. parge coat<br>Cost = (\$2./sq. ft. x \$1400. + \$13./sq. ft. x 1400 sq. ft. x 30% x $\frac{20}{10}$ years) x 75%<br>= 10 (\$2,800. + \$10,920.) x .75% = \$10,290. |
| | Balcony Deterioration |
| Jablonsky<br>K&S<br>Hanscomb<br>Clayton | Cantilevered Steel Joist Balconies<br>- assume 30% of apartment stock prior to 1965 had cant. steel joist balconies<br>- assume 50% of balconies have or will deteriorate<br>- \$600./balcony (suite)<br>- apartment stock prior to 1965 represents 30% of total apartment stock in Ontario<br>Cost = \$600./balcony x 120 balconies x 30% X 50% x 30%<br>= \$3,240. |
| K&S<br>Clayton<br>Hanscomb | Balcony Slabs<br>- 50% of balcony slabs require repair<br>- 60% of housing stock - after 1965<br>- \$560. repair to slab of each balcony<br>Cost = \$560/balcony x 50% x 60% x 120 suites<br>= \$20,160. |
| K&S<br>Hanscomb | Balcony Inserts<br>- assume 30% replacement of all balcony inserts over 20 years<br>- \$800./suite<br>Cost = \$800./suite x 120 suites x 30%<br>= \$28,800. |

| eference | Item and Cost |
|---|---|
| | 3. BUILDING SYSTEMS |
| | Electrical |
| hore<br>Clayton<br>Hanscomb | Aluminum Conductors<br>- 60% of buildings built between 1965 and 1975<br>- constitutes approximately 40% of the total housing stock<br>- $200./suite - replace terminals<br>- $2000./suite - replace conductors<br>Cost = $2,200./suite x 120 suites x 60% x 40%<br>= $63,360. |
| Shore<br>layton<br>anscomb | Main Service<br>- 75% of buildings before 1977 are inadequate<br>- this represents 80% of the total housing stock<br>- $50,000. upgrade, $2,500. ground fault<br>Cost = $52,500. x 75% x 80%<br>= $21,000. |
| hore<br>layton<br>Hanscomb | Branch Feeders<br>- 75% of buildings before 1967 are inadequate<br>- This represents 45% of the total housing stock<br>- $700./suite<br>Cost = $700./suite x 75% x 45% x 120 suites<br>= $28,350. |
| | Lighting |
| hore<br>anscomb | Fluorescent Conversion - Corridors<br>- 80% of buildings prior to 1980 - 90% of building stock<br>- $1,200./floor + $60./suite<br>Cost = ($1,200./floor x 10 floors + $60./suite x 120 suites) x 80% x 90%<br>= $13,824. |
| hore<br>anscomb | Fluorescent Conversion - Per Suite<br>- all buildings require this<br>- $140./suite<br>Cost = $140./suite x 120 suites<br>= $16,800. |

| Reference | Item and Cost |
|---|---|
| | Heating |
| | Steel Tube Boiler |
| Shore | - replace 1 in 20 years |
| Hanscomb | - yearly maintenance $1,560. |
| Hanscomb | - replacement - $80,000. |
| | Cost = $1,560. x 20 yr. + $80,000<br>= $111,200. |
| | Isolation Valves |
| Clayton | - prior to 1965 - represents 35% building stock - replace 70% |
| Shore | - 1965-1975 - represents 38% building stock - replace 30% |
| | - 1975-1982 - represents 27% building stock - replace 15% |
| K&S | - assume a mean of 50% replacement initially, and 70% after 20 years. This would be a multiple factor of 1.2 times |
| Hanscomb | - $180./suite |
| | Cost = $180./suite x 120 suites x 1.2<br>= $25,920. |
| | Plumbing |
| | Galvanized Piping |
| Shore | - buildings prior to 1965 - 35% of building stock - 50% replace |
| | - buildings 1965 to 1975 - 40% of building stock - 75% replace |
| | - of the 75% of building stock the mean of 63% |
| Hanscomb | - $450./suite |
| | Cost = $450./suite x $120 x 75% x 63%<br>= $25,515. |
| | Isolating Valves |
| Shore<br>K&S | - assume 50% of existing stock must be replaced now and 50% again within 20 years |
| Hanscomb | - $170./suite |
| | Cost = $170./suite x 120 suites<br>= $20,400. |
| | Plumbing Brass |
| Shore | - over next 20 years, assume 100% replacement |
| Hanscomb | - $360./suite |
| | Cost = $360./suite x 120 suites<br>= $43,200. |

| Reference | Item and Cost |
|---|---|
| Shore<br>Hanscomb | Hot Water Heaters<br>- in 20 years, all heaters will require major servicing<br>- $100./suite<br>Cost = $100./suite x 120 suites<br>= $12,000. |
| Shore<br>Hanscomb | Sprinkler System<br>- 75% of building prior to 1978 - 85% of building stock<br>- $140./car<br>Cost = $140./car x 120 x 75% x 85%<br>= $10,710. |
| | Ventilation |
| Shore | Corridor Supply Unit<br>- replace once in 20 years<br>Cost = $500./unit x 20 units<br>= $10,000. |
| Shore<br>Hanscomb | Corridor System Controls<br>- 2 times in 20 years<br>- $1,000./building<br>Cost = $1,000 x 2<br>= $2,000. |
| Hanscomb | Corridor Maintenance<br>- $10./suite/year<br>Cost = $10./suite x 120 suites x 20<br>= $24,000. |
| Shore<br>Hanscomb | Individual Suite Upgrading<br>- assume 25% of suites require upgrading in 75% of buildings<br>- $400./suite<br>Cost = $400./suite x 120 suites x 75% x 25%<br>= $9,000. |

| Reference | Item and Cost |
|---|---|
| | 4. PARKING STRUCTURES |
| | Floor Slab |
| K&S | - assume all parking structures will require repair in 20 years |
| Hanscomb | - $150./car |
| | Cost = $150./car x 120 cars<br>= $18,000. |
| | Traffic Bearing Membrane |
| | - 90% of garages are unprotected |
| Hanscomb | - $600./car |
| | Cost = $600./car x 120 cars x 90%<br>= $64,800. |
| | Lanscaped Roof Slab |
| Hanscomb | - $11./car waterproofing |
| Hanscomb | - $600./car excavation, re. landscaping |
| K&S | - assume 50% of surface will have to be replaced once |
| | Cost = $611./car x 120 cars x 50%<br>= $36,600. |
| | Expansion Joint |
| | - assume 100 lin. ft. of expansion joint repair |
| Hanscomb | - $200./lin. ft. repair cost |
| | Cost = $200./lin. ft. x 100 lin. ft.<br>= $20,000. |
| | Ramp |
| | This is a major ongoing problem with no permanent solution |
| | - repair glycol system using removable pavers |
| | - assume 100% of all slabs must be replaced once |
| Hanscomb | Cost = $20,000. for new glycol piping + $15,000. for paver topping<br>= $35,000. |
| | 5. OCCUPANT SAFETY |
| | Fireman's Elevator |
| K&S | - assume 75% of buildings require installation |
| Hanscomb | - $40,000./Elevator |

| Reference | Item and Cost |
|---|---|
| | 6. MOVEMENT SYSTEMS |
| | Movement systems not considered in this hypothetical model. |
| | Fireman's Elevator (cont'd) |
| | Cost = $40,000. x 75% |
| | = $30,000. |
| | Emergency Power |
| Shore | - buildings prior to 1975 require installation - this represents |
| Clayton | approximately 70% of building stock |
| Hanscomb | - $10,000./building |
| | Cost = $10,000. x 70% |
| | = $7,000. |
| | Voice Communications Systems |
| Hanscomb | - $240/suite |
| | Cost = $240./suite x 120 suites |
| | = $28,800. |
| | P.O.C. |
| Shore | - not required before 1978 - 85% of building stock |
| K&S | - assume 70% not retrofitted |
| Hanscomb | - $50./suite |
| | Cost = $50./suite x 120 suites x 70% x 85% |
| | = $3,570. |

## COSTS FOR MAINTENANCE AND CONSERVATION TOTALS

### WEATHER PROTECTION

| | | | |
|---|---|---|---|
| Flat Roof Systems | * - Conventional | $ 96,000. | |
| | - Inverted | 67,200. | |
| Masonry Walls | * - Patch Maintenance | 336,600. | |
| | - Cladding | 207,000. | |
| Windows | * - Storm | 78,000. | |
| | - Thermal | 300,000. | |
| Caulking | * - Ongoing | 10,800. | |
| | Total* | | $521,400. |

### STRUCTURAL

| | | | |
|---|---|---|---|
| Shelf Angles | | $ 92,880. | |
| Masonry | | 56,530. | |
| Balconies | | 52,200. | |
| | Total | | $201,61 |

### PARKING STRUCTURES

| | | | |
|---|---|---|---|
| Floor Slab | | $ 18,000. | |
| Traffic Membrane | | 64,800. | |
| Landscaped Roof Slab | | 36,600. | |
| Expansion Joints | | 20,000. | |
| Ramp | | 35,000. | |
| | Total | | $174,460. |

### OCCUPANT SAFETY

| | | | |
|---|---|---|---|
| Fireman's Elevator | | $30,000. | |
| Emergency Power | | 7,000. | |
| Voice Communications Systems | | 28,000. | |
| P.O.C. | | 3,570. | |
| | Total | | $68,570. |

## COSTS FOR MAINTENANCE AND CONSERVATION TOTALS

### BUILDING SYSTEMS

| | | |
|---|---|---|
| Electrical | $112,710. | |
| Heating | 137,120. | |
| Plumbing | 111,825. | |
| Ventilation | 45,000. | |
| Lighting | 30,620. | |
| Total | | $437,275. |
| GRAND TOTAL = | | $1,403,315. |

## PART 4.2.2

# THE POSSIBLE IMPACT OF FUTURE CONSERVATION COSTS ON RENTS

Prepared by:

Clayton Research Associates

## 4.2.2 THE POSSIBLE IMPACT OF FUTURE CONSERVATION COSTS ON RENTS

### 1.0 FACING THE CONSERVATION COSTS

Landlords know that these sorts of costs arise, so in a normal situation their planning for the project will have allowed for contingency expenses either through the build-up of a reserve fund or through expectations of future rent increases which will offset costs of this nature. In a situation where rental markets are balanced and rents are market-determined, such costs would be financed directly out of a reserve fund or out of profits since, in theory at least, the rents would be as high as the market would bear and extra costs could not be passed through to tenants without risking some increase in vacancies. Rational landlords would still undertake the work (if it is warranted) because it would be a necessary expenditure to prolong the life of the structure - and hence, would be an element in future profit-maximization.

Clearly, such a scenario is out of place in today's rental market:

- Rents are not market-determined; many landlords could pass through significant rent increases if the rent review process allowed it;

- The rental market is not balanced; many tenants would have difficulty finding alternative accommodation and thus the necessary market restraint to compel landlords to moderate their rent demands would be weaker;

- Rent review will allow such costs to be passed through but only on an as-incurred basis; i.e., landlords must apply each year in which costs occur so they cannot put forward a program for future conservation at one time; they must endure the time-consuming and costly review process each time.

In the current rental market, the landlord's actions will likely be different from the free market situation. Key informant interviews with landlords indicated that in many cases they have been postponing or minimizing expenditures on items such as conservation costs because of the rent review process. While landlords appear to be aware that such costs can be passed through the rent review process to be borne by tenants they are apparently reluctant to do so because of the difficult and time-consuming nature of the process, the ill-will created with tenants and a general feeling that the landlord loses as a result of the process. Despite this reluctance to undergo rent review, however, there appear to be few other options open to landlords:

- If they do not undertake the conservation work, eventually the building will deteriorate and this will be reflected in the value of the building - it seems likely that few rational landlords would choose this course simply to avoid the rent review process.

- Similarly, to undertake the work and bear the costs themselves would not be a rational profit-maximizing decision on the part of landlords.

- Selling the building would be one way to avoid the process and this appears until recently to have been a popular means of obtaining higher rents (and thus a higher value property) since the increased financing costs could be passed along to tenants by the new landlord. In any case, however, the new landlord would then be faced with the conservation costs and presumably would be willing to undergo the rent review process.

- Conversion to condominium would be the best solution for many landlords since the buildings are generally worth much more as condominiums, however, severe limits have been imposed on this activity in many municipalities.

- Demolition is likely to be a sensible option only in a very limited number of cases where the site of the property is worth more than the stream of future rent revenue from the building.

It seems clear that whether they like it or not, most landlords of buildings subject to rent review will ultimately be forced by economic necessity either to use the system to obtain justifiable rent increases for conservation (or other) costs or to sell to someone who will. This appears to be borne out by the fact that the proportion of buildings which apply through rent review for rent increases above the 6 percent guidelines appears to have increased dramatically from the very low levels experienced in the late 1970's[1]. It appears unlikely, however, that landlords will undertake major expenditures such as conservation costs on an annual basis; it would seem more sensible to minimize or postpone expenditures in most years and then lump them all together in one year - thereby minimizing the number of appearances before the rent review process but nonetheless obtaining the cost pass-through to rents which is necessary to finance the increased costs.

The rent review process does not, however, award an immediate pass-through of all costs. Depending on the life expectancy of the conservation work, various amortization schedules are applied so as to spread the compensating rent revenue across the life of the improvement. This can be a complicated process especially for a mixed bag of items such as the conservation increases described in the previous section where the life expectancy of each specific item varies from 5 years to 40 years. The overall average likely life expectancy of the conservation costs outlined for the hypothetical building is estimated (roughly) to be around 20 years. In determining the rent increase associated with each of these expenditures, both these costs plus the necessary financing costs are taken into account.

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[1] Discussions with rent review officials indicate that, prior to 1981, on an annual basis, only about 5 percent of the stock subject to rent review applied for increases above 6 percent; this has recently increased to about 20 percent of the stock. Part of the reason for the increase was, no doubt, the higher financing costs associated with mortgage rollovers or resales but these causes are estimated to account for only 25 percent of claims so other costs are important as well.

## 2.0 RENT IMPACTS ON THE HYPOTHETICAL BUILDING

This section examines the likely impact on rents of the conservation costs of the hypothetical building described in Section 5.2.1. For the purposes of calculating the rent increases, a number of simplifying assumptions are made:

. The building is under rent review and the rent review rules remain unchanged throughout the period;

. In order to minimize appearances before the rent review process, the landlord will time the work such that all the costs are incurred in 4 separate years (1982, 1987, 1992, 1997) over the 20 year study period;

. The full costs associated with the conservation expenditures are allowed to be passed through to tenants via rent increases;

. In terms of amortizing the costs for the purpose of determining rent increases, three scenarios are used; it is assumed that rent review amortizes the costs over:

  - 10 years, for one scenario;
  - 20 years, for another; and
  - 30 years, for another;

. The costs are financed totally through a 15 percent mortgage with the same amortization schedule as is dictated by the rent review process for the conservation costs themselves;

. No other cost increases are incurred in the years when the conservation costs are passed through rent review (of course, other costs would be included in most applications to rent review, however, this section is interested in the rent impacts that can be expected from the conservation costs); and

. All of the costs (and rents) are expressed in 1982 constant dollars.

The total estimated conservation costs of the hypothetical building over the next 20 years (in 1982 dollars) are $1,403,300. or $11,694. per unit for each of the 120 units in the building. It is assumed that these costs will be incurred in the following years:

| | | $000's |
|---|---|---|
| 1982, | 40 percent or | $ 561.2 |
| 1987, | 20 percent or | 280.7 |
| 1992, | 20 percent or | 280.7 |
| 1997, | 20 percent or | 280.7 |
| | 100 | $1,403.3 |

For buildings under rent review, these costs will be spread across an amortization period to be specified by the rent review process - each item will be assigned an amortization period. It would be far too lengthy a process and it would not serve the needs of this study to attempt to itemize each of the costs with a different amortization schedule for the purposes of rent-determination. Rather, the far simpler process of assuming that all costs face the same amortization schedule (10 years in one scenario, and 20 years in another and 30 years in another) has been adopted. Under these three scenarios (assuming a 15 percent mortgage rate) the annual financing costs would be distributed as follows:

| Amortized Costs for Expenditures Incurred in | Annual Costs (000's) | | |
|---|---|---|---|
| | 10 Year Amortization | 20 Year Amortization | 30 Year Amortization |
| 1982 | 106.8 | 86.5 | 82.7 |
| 1987 | 53.4 | 43.2 | 41.4 |
| 1992 | 53.4 | 43.2 | 41.4 |
| 1997 | 53.4 | 43.2 | 41.4 |

* Assuming a 15 percent mortgage with blended payments over the full amortization period.

To explain, the $561,200. of conservation costs incurred in 1982 would cost $106,800. annually if they were financed over a 10 year amortization period; if they were financed over a 20 year amortization period, the annual cost would be reduced to $86,500.; over 30 years, the annual financing costs for the 1982 expenditures are further reduced to $82,700. Since the amortization schedules for the costs incurred in various years overlap, the annual costs in 1987 will increase to include both the costs associated with the 1982 expenditures and the costs associated with the 1987 expenditures. For the 20 and 30 year amortization schedules, the 1982 costs are spread over the entire 20 year (1982-2002) period under consideration here, and thus they cumulate as each subsequent cost is incurred (e.g., by the time the 1997 costs are incurred, the 1982, 1987 and 1992 costs are still being amortized). For the 10 year amortization schedule, the costs phase out after 10 years (i.e., by 1992, all of the 1982 costs have been paid for).

The following figures indicate the amortized costs which would accrue to each year in the 1982-2002 period under the specified assumptions:

Cumulative Amortized Costs Incurred Annually (000's)

| | 10 Year Amortization | 20 Year Amortization | 30 Year Amortization |
|---|---|---|---|
| 1982-1987 | 106.8 | 86.5 | 82.7 |
| 1987-1992 | 160.2 | 129.7 | 124.1 |
| 1992-1997 | 106.8 | 172.9 | 165.5 |
| 1997-2002 | 106.8 | 216.1 | 206.9 |

According to the rules of the rent review process, these costs can be passed through to tenants in the form of rent increases. The rent increases will, however, vary significantly depending on the amortization period selected for the conservation costs.

Estimated Average Monthly Rent Increases Per Unit($)*

| Year of Rent Increase | 10 Year Amortization | 20 Year Amortization | 30 Year Amortization |
|---|---|---|---|
| 1982 | 74 | 60 | 57 |
| 1987 | 37 | 30 | 29 |
| 1992 | - | 30 | 29 |
| 1997 | - | 30 | 29 |

* Calculated from increase in cumulative amortized costs (eg., 10 year amortization in 1982: [($106,800. ÷ 120 units) ÷ 12 months] = $74.).

Clearly, the shorter the amortization period, the larger the immediate compensating rent increase: for the 10 year amortization scenario, there are no more rent increases after 1987 whereas, for the 20 and 30 year scenarios, the costs keep pyramiding throughout the period and, consequently, rents continue to increase as well.

## 3.0 RENT IMPACTS ON PRIVATE CASE STUDY BUILDINGS

This section examines the likely impact on rents in the three private case study buildings of the conservation costs described in Section 5.2.1 For the purposes of calculating the rent increases, the same set of simplifying assumptions as were made in the case of the hypothetical building are assumed for this analysis as well.

The unit-type breakdown and current average rents of the three buildings are summarized below along with an estimate of gross revenue in 1982; the latter figure will be used later in the analysis to calculate the estimated percent rent increase required to cover the conservation costs.

---

### Unit Types And Average Rents

| | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| **Number of Units** | | | |
| Bachelor | 24 | 20 | 120 |
| One-Bedroom | 58 | 80 | 40 |
| Two-Bedroom | 61 | 2 | 0 |
| Three-Bedroom | 27 | 0 | 0 |
| Total | 170 | 102 | 160 |
| **Average Rents ($)** | | | |
| Bachelor | 310 | 300 | 120 |
| One-Bedroom | 340 | 382 | 170 |
| Two-Bedroom | 415 | 650 | - |
| Three-Bedroom | 460 | - | - |
| Total Estimated Gross Revenue (000's)* | 740 | 432 | 242 |

* Calculated by assuming the above rents for each unit plus a 5 percent vacancy (or non-payment) factor. This figure will be used later in calculating the estimated rent increase required to pass through the construction costs.

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According to the investigations described in Section 5.2.1, these buildings will face conservation costs of $1,155,000. (Case Study 2), $1,051,900. (Case Study 4) and $1,503,900. (Case Study 5) over the next 20 years. These costs will be incurred in different proportions in each of the periods:

---

Distribution Of Conservation Costs

| | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| **Percent** | | | |
| 1982-1987 | 50 | 50 | 40 |
| 1987-1992 | 10 | 20 | 20 |
| 1992-1997 | 20 | 10 | 20 |
| 1997-2002 | 20 | 20 | 20 |
| Total | 100 | 100 | 100 |
| **(000's)** | | | |
| 1982-1987 | 578.0 | 525.9 | 601.5 |
| 1987-1992 | 115.6 | 210.4 | 300.8 |
| 1992-1997 | 231.2 | 105.2 | 300.8 |
| 1997-2002 | 231.2 | 210.4 | 300.8 |
| Total | 1,156.0 | 1,051.9 | 1,503.9 |

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As with the hypothetical building, the effect of these conservation costs on rents varies depending on the amortization period selected by the rent review process as the appropriate life of the improvement. In actual cases before rent review, each improvement would be assigned a different amortization period according to its estimated life; as with the hypothetical building, three amortization periods (10, 20 and 30 years) are presented here for illustrative purposes.[1] The procedures used in the calculations is the same as that used in the hypothetical buildings:

- First, the annual cost of the improvement incurred in each year are calculated, e.g., for Case Study 2, the annual cost for the $578,000. expenditure incurred in 1982 is $110,000. for the 10 year amortization period; since this is amortized over 10 years, this annual cost must be met throughout the 1982-1992 period.

- Second, the cumulative amortized costs are presented, e.g., for Case Study 2 in the 10 year amortization scenario, the amortized cost will be $110,000. annually for 1982-1987 rising to $132,000. annually in 1987-1992 since the $22,000. annual costs for the 1987 expenditures must be added; by

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[1] In the case of the hypothetical building the average amortization period was about 20 years; it appears likely that the 20 year period would broadly apply in these buildings as well.

1992, the 1982 cost will be fully paid off under the 10 year amortization scenario), so the cumulative amortized costs will drop to cover only the costs incurred in 1986 and 1992. For the longer amortization periods, the cumulative costs continue to increase throughout the 20-year period since the 1982 costs are amortized for the whole period in the case of 20 year amortization and longer in the case of the 30 year amortization.

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### Annual Costs (000's) - 10 Year Amortization Scenario*

| Amortized Costs for Expenditures Incurred In: | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| 1982 | 110.0 | 100.1 | 114.5 |
| 1987 | 22.0 | 40.0 | 57.2 |
| 1992 | 44.0 | 20.0 | 57.2 |
| 1997 | 44.0 | 40.0 | 57.2 |
| Cumulative Amortized Costs | | | |
| 1982-1987 | 110.0 | 100.1 | 114.5 |
| 1987-1992 | 132.0 | 140.1 | 171.7 |
| 1992-1997 | 66.0 | 60.0 | 114.4 |
| 1997-2002 | 88.0 | 60.0 | 114.4 |

* Assuming a 15 percent mortgage with blended payments over 10 years (monthly factor 15.860 x 12 months).

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### Annual Costs ($000) - 20 Year Amortization Scenario*

| Amortized costs for Expenditures Incurred In: | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| 1982 | 89.0 | 81.0 | 92.7 |
| 1987 | 17.8 | 32.4 | 46.3 |
| 1992 | 35.6 | 16.2 | 46.3 |
| 1997 | 35.6 | 32.4 | 46.3 |
| Cumulative Amortized Costs | | | |
| 1982-1987 | | | |
| 1987-1992 | 89.0 | 81.0 | 92.7 |
| 1992-1997 | 106.8 | 113.4 | 139.0 |
| 1997-2002 | 142.4 | 129.6 | 185.3 |

* Assuming a 15 percent mortgage with blended payments over 20 years (monthly factor 12.838 x 12 months).

Annual Costs (000's) - 30 Year Amortization Scenario*

| Amortized Costs for Expenditures Incurred In: | Private Buildings Case Study 2 | Private Buildings Case Study 4 | Non-Profit Building Case Study 5 |
|---|---|---|---|
| 1982 | 85.2 | 72.5 | 88.7 |
| 1987 | 17.0 | 31.0 | 44.4 |
| 1992 | 34.1 | 15.5 | 44.4 |
| 1997 | 34.1 | 31.0 | 44.4 |
| Cumulative Amortized Costs | | | |
| 1982-1987 | 85.2 | 77.5 | 88.7 |
| 1987-1992 | 102.2 | 108.5 | 133.1 |
| 1992-1997 | 136.3 | 124.0 | 177.5 |
| 1997-2002 | 170.4 | 155.0 | 221.9 |

* Assuming a 15 percent mortgage with blended payments over 30 years (monthly factor 12.287 x 12 months).

The difference between the 10 year amortization scenario and the other two is most significant because the conservation costs are paid off faster. The 1987-1992 period is the one in which the greatest cumulative amortized costs occur in the case of the 10 year amortization scenario; in the other two cases, the cumulative amortization costs continue to build throughout the period.

The final stage in this analysis is to estimate the rent increases which are necessary to offset these amortized costs. The estimated gross revenue from each building was estimated earlier as:

- Case Study 2: $740,000.
- Case Study 4: $432,000.
- Case Study 5: $242,000.

Using these estimates as an approximation of the cost base on which rent increases will be determined, it is possible to estimate the percentage increase in rents which is required to offset the conservation costs under each of the 3 amortization scenarios.

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Estimated Percent Increase In Rents (Compared To 1982 Rents)
Required To Offset Conservation Costs*

| 10 Year Amortization Scenario | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| 1982-1987 | 14.9 | 23.2 | 47.3 |
| 1987-1992 | 17.8 | 32.4 | 71.0 |
| 1992-1997 | 8.9 | 13.9 | 47.3 |
| 1997-2002 | 11.9 | 13.9 | 47.3 |
| **20 Year Amortization Scenario** | | | |
| 1982-1987 | 12.0 | 18.8 | 38.3 |
| 1987-1992 | 14.4 | 26.3 | 57.4 |
| 1992-1997 | 19.2 | 30.0 | 76.6 |
| 1997-2002 | 24.1 | 37.5 | 95.7 |
| **30 Year Amortization Scenario** | | | |
| 1982-1987 | 11.5 | 17.9 | 36.7 |
| 1987-1992 | 13.8 | 25.1 | 55.0 |
| 1992-1997 | 18.4 | 28.7 | 73.3 |
| 1997-2002 | 23.0 | 35.9 | 91.7 |

* The estimates presented here are based on the assumption that rent increases will entirely offset the amortized conservation costs; the estimated rent increases therefore reflect the percent which the amortized conservation costs represent of estimated gross revenues in 1982. All percent increases relate to the 1982 rent base. The derivation of these rent increase figures is explained in tabulations appended to this section.

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The magnitude of the rent increases required to offset the conservation costs varies significantly with the amortization period selected. For example:

- Case Study 2 faces an immediate 1982 rent increase of 14.9 percent if the conservation costs are amortized over 10 years but only 11.5 percent if a 30 year amortization period is selected.
  - in 1987, a further small increase of 2-3 percent would be allowed under each amortization scenario.
  - in 1992, no increase would be allowed under the 10 year amortization scenario, in fact, the drop in costs would jeopardize rent increases

allowed on the basis of other cost increases. Increases of 4-5 percent would be allowed under the 20 and 30 year amortization scenarios.

- in 1997, increases would be allowed under all amortization scenarios.

It must be borne in mind in interpreting these percent rent increase estimates that they all relate to the 1982 base rent in 1982 dollars. Therefore, to the extent that this base rent increases to offset conservation costs in 1982 or 1987, the percent increase in actual rent in subsequent years will be smaller than that indicated.

These estimated percent rent increases relate only to the increases necessary to cover the conservation costs under each of the amortization scenarios. No doubt, other costs will increase as well so it is likely that these increases will represent only one portion of a larger rent review cost pass-through award. No attempt has been made here to estimate the extent of these other cost increases.

The rent increases necessary to cover the conservation costs are significant in all cases; and they are also most severe in the initial year - 1982 in the above example. Even a 12 percent increase is substantial - especially when it is recognized that this does not include other (non-conservation) cost increases.

The most severe rent increases would be felt by the non-profit building because of the low rent structure of the building at present; in the absence of offsetting subsidies, rents in this building will increase by 55-70 percent by 1987 for conservation costs alone. This substantial level of rent increase would not bring rents in this building up to prevailing market rents for comparable accommodation but it would likely represent a severe financial burden in tenants.

For the two private buildings, increases in rents of 15-30 percent by 1987 to cover conservation costs alone would likely go a long way towards offsetting the amounts by which rent review has held down rents since 1976. For comparison, in the hypothetical circumstance where a landlord has accepted 6 percent annual rent increases since 1976 where (in the absence of rent review) he might have expected to obtain a 10 percent annual rate of increase (approximating the rate of inflation for the period), by 1982 the magnitude of the differential in rent would be about 25 percent - by 1987 the differential would be 50 percent. Clearly, the passthrough of the estimated conservation costs would bring rents back much closer to the point where they might have been in the absence of rent review.

This analysis has concentrated only on the rent increases which can be expected as a result of the conservation costs on the two private buildings and the non-profit building. No attempt has been made to assess the effect on rents in the public housing case studies since, of course, such costs would not impact public housing rents which bear no relation to costs. Such costs will have to be financed through increasing operating subsidies to public housing authorities by the various levels of government.

## SUPPLEMENTARY TABLES

These three tabulations present the cumulative amortized costs which pertain to each of the private case study buildings under the three amortization scenarios (10 year, 20 year and 30 year). These costs compared to the estimated 1982 gross revenue were used in calculating the rent increase necessary to offset the conservation costs.

### Increase In Rents Required To Offset Conservation Costs - 10 Year Amortization Scenario

| | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| Estimated 1982 Gross Revenue ($000) | 740.0 | 432.0 | 242.0 |
| **Cumulative Amortized Costs ($000)** | | | |
| 1982-1987 | 110.0 | 100.1 | 114.5 |
| 1987-1992 | 132.0 | 140.1 | 171.7 |
| 1992-1997 | 66.0 | 60.0 | 114.4 |
| 1997-2002 | 88.0 | 60.0 | 114.4 |
| **Required Percent Increase in Rents (Amortized Costs/ Gross Revenue)** | | | |
| 1982-1987 | 14.9 | 23.2 | 47.3 |
| 1987-1992 | 17.8 | 32.4 | 71.0 |
| 1992-1997 | 8.9 | 13.9 | 42.3 |
| 1997-2002 | 11.9 | 13.9 | 47.3 |

### Increase In Rents Required To Offset Conservation Costs - 20 Year Amortization Scenario

| | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| Estimated 1982 Gross Revenue ($000) | 740.0 | 432.0 | 242.0 |
| Cumulative Amortized Costs ($000) | | | |
| 1982-1987 | 89.0 | 81.0 | 92.7 |
| 1987-1992 | 106.8 | 113.4 | 139.0 |
| 1992-1997 | 142.4 | 129.6 | 185.3 |
| 1997-2002 | 178.0 | 162.0 | 231.6 |
| Required Percent Increase in Rents (Amortized Costs/ Gross Revenue) | | | |
| 1982-1987 | 12.0 | 18.8 | 38.3 |
| 1987-1992 | 14.4 | 26.3 | 57.4 |
| 1992-1997 | 19.2 | 30.0 | 76.6 |
| 1997-2002 | 24.1 | 37.5 | 95.7 |

## Increase In Rents Required To Offset Conservation Costs - 30 Year Amortization Scenario

| | Private Buildings | | Non-Profit Building |
|---|---|---|---|
| | Case Study 2 | Case Study 4 | Case Study 5 |
| Estimated 1982 Gross Revenue ($000) | 740.0 | 432.0 | 242.0 |
| Cumulative Amortized Costs ($000) | | | |
| 1982-1987 | 85.2 | 77.5 | 88.7 |
| 1987-1992 | 102.2 | 108.5 | 133.1 |
| 1992-1997 | 136.3 | 124.0 | 177.5 |
| 1997-2002 | 170.4 | 155.0 | 221.9 |
| Required Percent Increase in Rents (Amortized Costs/ Gross Revenue) | | | |
| 1982-1987 | 11.5 | 17.9 | 36.7 |
| 1987-1992 | 13.8 | 25.1 | 55.0 |
| 1992-1997 | 18.4 | 28.7 | 73.3 |
| 1997-2002 | 23.0 | 35.9 | 91.7 |

# PART 4.2.3

# THE POSSIBLE IMPACT OF FUTURE CONSERVATION COSTS ON TENANTS

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## 4.2.3 THE POSSIBLE IMPACT OF FUTURE CONSERVATION COSTS ON TENANTS

### 1.0 INTRODUCTION

This section examines the impact which the conservation costs (and resulting rent increases) discussed in Sections 4.2.1 and 4.2.2 will likely have on tenants. The initial intended purpose was to indicate the extent to which tenants might be forced to relocate due to rent increases; however, data deficiences with regard to tenant incomes and rents have required that the analysis be much more general than was initially intended.

The first part of this section presents a brief review of tenant characteristics in major Ontario centres to set the stage for an analysis (in the second part) of the impact on tenants of rent increases as a result of the conservation costs and, finally, the options open to tenants and government in allaying the impact of these rent increases on needy tenants.

## 2.0 TENANT PROFILE

Information on tenants and their ability to afford their accommodation is sketchy at best. Nonetheless, several broad conclusions are evident:

- The vast majority of tenants are able to afford their current rental accommodation;
- Some tenants (or would-be tenants) face serious affordability problems in obtaining adequate accommodation in the private rental market;
- While some tenant groups such as the elderly and lone-parent families have been demonstrated to be especially vulnerable, some proportion of tenant families and individuals in all age groups and family situations have affordability difficulties;
- Not all tenants with affordability problems are eligible for government housing assistance programs and not all those that are eligible for such programs are, in fact, able to obtain assistance; and
- Not all tenants with apparent affordability problems are in need of assistance.

These conclusions are based on an analysis of the preliminary results of the 1981 Rental Market Survey conducted by the Ministry of Municipal Affairs and Housing. This survey represents the latest information available on tenant characteristics and affordability in seven large Ontario centres.[1] Each of the above conclusions is substantiated below using the results of this survey.

Most tenants can afford their current accommodation - weighted survey results indicate that about three-quarters of tenants had rent/income ratios of 25 percent or less in 1981. Only about 15 percent of tenants pay more than 30 percent of their income in rent. Comparison of the 1981 survey results with the 1980 survey results indicates that rent/income ratios appear to have dropped significantly in the period between the surveys.

Many tenants face serious affordability problems - while it is true that the majority of tenants are able to afford their accommodation, there remain some tenants who must devote a disproportionate share of their income to rent payments. If 25 percent of income is regarded as the appropriate maximum rent which tenants can afford, about one-quarter of tenants in 1981 were paying more than they could afford; if the appropriate maximum ratio is regarded as 30 percent of income, about 15 percent of tenants were paying too much.

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[1] The survey covers Metro Toronto, Hamilton, London, Windsor, Ottawa, Thunder Bay and Sudbury. The results of the survey are still preliminary and, in some cases, the figures presented here have been adjusted by Clayton Research Associates to reflect the weighting by tenant characteristics revealed in the 1981 Census of Canada.

All tenant groups have some members with affordability problems - while the elderly are estimated to account for almost 40 percent of tenants with rent/income ratios in excess of 30 percent, some households in all age groups pay an excessive proportion of their income in rent.

Age Of Head Of Tenant Households
Paying More Than 30 Percent
Of Income In Rent

| Age of Head | Percent |
|---|---|
| Under 25 | 17.2 |
| 25-44 | 25.6 |
| 45-54 | 8.2 |
| 55-64 | 10.8 |
| 65 and over | 38.2 |
| Total | 100.0 |

Source: Preliminary weighted results from 1981 Rental Market Survey.

Similarly, households of all types are represented in the group of tenants who pay in excess of 30 percent of their income in rent.

Type Of Tenant Households
Paying More Than 30 Percent
Of Income In Rent

| Household Type | Percent |
|---|---|
| Family with Children | 24.6 |
| Family without Children | 10.9 |
| Non-Family | 64.5 |
| Total | 100.0 |

Source: Preliminary raw results from 1981 Rental Market Survey.

Almost two-thirds of tenants devoting more than 30 percent of their income to rent are non-family households; probably just over half of these non-family households would be elderly people, but the remainder would be younger.

Families with children comprise about one-quarter of the tenants paying in excess of 30 percent of their income in rent - the survey sample was too small to say reliably how many of these are single-parent families. Families with no children comprise only about 10 percent of the needy tenants.

Not all needy tenants are eligible for government houisng assistance programs - government housing assistance programs are targeted primarily at elderly people and families with children. The survey results indicate that tenants with affordability problems include other groups as well. One group with particular difficulties identified in another section of this report is comprised of single persons aged 40-60; while not large in numbers, they do represent one clearly identifiable group with particular housing problems no currently being met by government housing assistance programs.

Not all needy tenants eligible for government housing assistance programs actually obtain assistance - the fact that some 15 percent of all tenants surveyed devote more thant 30 percent of their income to rent and the majority of these tenants are elderly or families with children (both of which are target groups for housing assistance programs) indicates that current housing programs are not serving all of their target groups. The lengthy waiting lists for public housing are another indicator of the inadequacy of current government housing assistance in meeting the needs of the target groups.

Some tenants with apparent affordability problems do not appear to be in need - despite the fact that they must devote an excessive proportion of their income in rent, some tenants apparently deliberately choose to live in more expensive accommodation than they require. The Rental Market Survey indicated that many tenants with rent/income ratios in excess of 25 percent live in accommodation larger than their basic needs.[1]

Unit Type By Household Size For Tenant Households
Paying More Than 25% Of Income In Rent (Percent)

| No. of Persons | Room | Bachelor | 1-Bedroom | 2-Bedroom | 3+ Bedroom | Total |
|---|---|---|---|---|---|---|
| 1 | 1.3 | 11.5 | 58.0 | 24.6 | 4.6 | 100.0 |
| 2 | 0.5 | 1.4 | 32.0 | 56.3 | 9.9 | 100.0 |
| 3 | 1.2 | 0.0 | 9.8 | 45.1 | 43.9 | 100.0 |
| 4 | 0.0 | 0.0 | 2.3 | 37.2 | 60.5 | 100.0 |
| 5 | 0.0 | 0.0 | 0.0 | 14.3 | 85.7 | 100.0 |
| 6+ | 0.0 | 0.0 | 0.0 | 11.1 | 88.9 | 100.0 |
| Total | 0.9 | 5.6 | 37.7 | 37.7 | 18.2 | 100.0 |

Source: Preliminary raw results from 1981 Rental Market Survey.

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[1] Survey results for tenants with rent/income ratios in excess of 30 percent were not available on this breakdown.

For example, less than 15 percent of single-person households who pay more than 25 percent of their income in rent live in rooms or in a bachelor apartment; almost 30 percent have 2 or more bedroom units and 58 percent had one-bedroom units. Few tenants paying more than 25 percent of their income in rent appear to live in overcrowded conditions, many choose to live in accommodation which is larger than what most observers would regard as their basic needs.

To conclude, therefore, while most tenants are clearly not having difficulty meeting their rent payments, there is a significant minority which do have such problems. Though the size of this group is difficult to estimate, it is clear that it is comprised of some tenants who are not currently eligible for government housing assistance and other tenants who, while eligible, do not currently obtain such assistance.

## 3.0 CONSERVATION COSTS IMPACT

It was shown in Section 4.2.2 that the immediate impact of the expected conservation costs on rents in the case study private rental buildings would vary from about 12 percent to 23 percent depending on the extent of the conservation costs themselves and on the amortization period assigned to the conservation improvements. There can be little doubt that rent increases of this magnitude (plus whatever other financing or operating cost-related rent increases might be appropriate) would have a significant impact on some tenants. It would inevitably result in an increase in the proportion of all tenants' incomes expended in rent. This would result in more tenants having to spend an excessive proportion of their income on rent or alternatively, in pushing these tenants into seeking ever scarcer lower-priced rental accommodation on the tight rental markets prevailing in most Ontario centres - tight, at least in terms of lower-priced accommodation.

Little empirical work is available (or possible) on the impact which such rent increases could have on tenants. In some work quoted in The Impact of Rent Review on Rental Housing in Ontario: A Staff Research Report from the Ministry of Municipal Affairs and Housing, J. Miron estimated the sensitivity of affordability to changes in rents relative to income.

Sensitivity Of Affordability Measures To Changes In Rents Relative To Income, 1978

| Percent Change in Rents Relative to Income | Percent of Households with Problem | |
|---|---|---|
| | 25% Threshold | 30% Threshold |
| 10% higher | 35.9 | 27.1 |
| 5% higher | 33.2 | 25.3 |
| no change | 30.2 | 23.3 |
| 4% lower | 28.4 | 21.9 |
| 10% lower | 26.4 | 20.4 |

Source: J. Miron "The Affordability of Rental Housing in Ontario: Empirical Findings, (Ministry of Municipal Affairs and Housing 1981) based on unpublished data from Statistics Canada Household Income, Facilities and Equipment, 1978.

This table is based on 1978 data and it seems likely that the figures overstate the proportion of tenant households with affordability problems today; recall that estimates based on the 1981 Rental Market Survey conducted by the Ministry of Municipal Affairs and Housing (and cited in the previous section) indicate that approximately 15 percent of renters paid in excess of 30 percent of their income in rent in 1981. Such an improvement in the number of tenants devoting an inordinate amount of their income on rent is consistent with the widely-held contention that rent review has improved the affordability situation for tenants.

Despite the necessary qualifications with regard to the fact that the data relates to 1978, Miron's tabulations provide a useful indicator of the magnitude of the tenant affordability problems which result when a large rent increase such as that related to the conservation cost pass-through occurs. To explain, in 1978, an estimated 23.3 percent of tenants paid in excess of 30 percent of their income in rent; if rents increased 5 percent more than incomes, the proportion paying in excess of 30 percent would rise to 25.3 percent. Similarly, if rents declined relative to income, fewer tenants would have affordability problems.

If it is assumed that, except for the conservation cost pass-through, rents and incomes rise by the same amount in the year that the cost pass-through is granted, clearly a significant number of tenants will be in a more disadvantaged situation than they were previously. With estimated private rent increases of 12-23 percent due to the conservation costs, the increase in the proportion of tenants with affordability problems would (according to Miron's figures) increase by more than 4 percentage points (at the 30 percent rent/income threshold) - say from the 15 percent estimated in 1981 to more than 19 percent.

It must be stressed that the Miron figures can only be regarded as a very rough indicator of the magnitude of the increase in tenants with affordability problems if the conservation cost pass-throughs were reflected in rent increases today:

- Miron's figures are based on 1978 estimates which will be substantially different today;
- The magnitude of the increases in the percent of renters with affordability problems resulting from rent increases will be different when 23 percent of renters already have a problem (in 1978) than when only 15 percent of renters have a problem (estimate for 1981); and
- Not all buildings will face the same percent increase in rents as a result of the conservation costs; the dramatic effect of the conservation costs on rents in the non-profit building, for example, will cause much greater difficulties for tenants than the projected increases for the private buildings.

Despite these data problems, it is clear that the increase in rents resulting from the conservation cost pass-throughs will result in an increase in the number of tenants with affordability problems. The magnitude of the increase may be open to question but there is little doubt it will be significant - raising the estimated 15 percent of tenants paying in excess of 30 percent of their income in rent in 1981 up to perhaps 20-25 percent if all rental buildings faced the rent increase at once (which, of course, they will not).

Future changes in the proportions of tenants with excessive rent/income ratios as a result of the expected conservation cost pass-throughs in 1986 and beyond are even more difficult to assess. If rent increases in the intervening years keep pace with income increases, clearly, the proportion of tenants paying an excessive amount of their income in rent would rise again. If, however, rent increases in the interim lag income increases (as they clearly have done since 1976), the proportion of tenants with affordability problems will decline in the interim, thus offsetting at least some (if not all) of the future conservation cost-related rent increase.

## 4.0 OPTIONS FOR TENANTS AND GOVERNMENT

The majority of tenants would be able to afford the rent increases likely to occur as a result of the pass-through of conservation costs. However, this fact should not cloud the issue that such rent increases will expand the size of the group with affordability problems and also will increase the severity of the difficulties for those who already have affordability problems. For these tenants, the problems caused by the rent increases are real and their options in dealing with them are limited.

- Moving to alternative accommodation is one option; however, rental markets are very tight at present - especially in low-cost accommodation. There are unlikely to be many low-rent alternatives on the private rental market.
- Doubling up with other tenants may be a viable option for some; however, this could lead to overcrowding depending on family circumstances.
- Applying for government assisted housing would be an option for some tenants, however, unless their need is extreme, there is unlikely to be alternative accommodation immediately available - waiting lists for assisted housing are very long. Also, some needy tenants (e.g., non-elderly single persons) are not eligible for assisted housing.
- For many, it would appear that the final option of doing nothing, i.e., staying on and paying the higher rent, will be the option selected; unfortunately, in many of these hardship cases, "doing nothing" means reallocating finances from other necessities into housing expenditures.

Government options in dealing with this problem are also limited. There appear to be three major options:

- Provide subsidies to landlords such that these conservation costs would not be passed through to tenants;
- Restrict allowable rent increases to below or equal to the rate of inflation or income growth so rents would not increase faster than incomes; or
- Expand the volume of assisted housing and the target groups for assisted housing such that all needy tenants would be able to obtain the assistance they require.

The first option, that of keeping rents low by providing subsidies to landlords would be extremely costly, administratively complex and very inefficient in terms of targeting government assistance to those in need: the 75-85 percent of tenants who do not require assistance would nonetheless obtain it at very substantial government expense.

The second option, restricting rent increases to levels that tenants can afford suffers basically from the same problems as the first - with the major difference that the costs would be borne by landlords rather than the government. This would discourage landlords from undertaking the conservation measures thus leading to the deterioration of the quality of the rental stock. It would also have the effect of further discouraging new rental investment since the onerous (in the view of landlords at least) rent review provisions would be altered further to the disadvantage of landlords.

The third option, that of expanding the assistance available to needy tenants appears clearly to be the most sensible long-term option available, but it would also be very expensive. Ideally, such an initiative would not be targeted simply at tenants who were disadvantaged by rent increases due to conservation costs, but would be part of a comprehensive program targeted at all needy tenants. Such a program would require a greater commitment of funds than governments have been willing to devote to the problem in the past plus a recognition that the current target groups for government housing assistance are too narrow. The program to assist needy tenants could be structured in a number of different ways including direct government provision of low-cost housing, subsidies through non-profit or co-operative housing groups or shelter allowances. While it is beyond the scope of this report to recommend which type of program would be most effective, it is to be hoped (and expected) that the program would be:

- Efficient - directing assistance only to those who are in need;
- Equitable - including in the target group tenants such as low-income non-elderly single people who are not currently eligible for housing assistance and providing sufficient funds that all those in the target groups receive assistance; and
- Integrated - ensuring that assisted tenants are integrated into the community and not concentrated in low-income housing ghettos.

Whatever approach the government selects, it is clear that the conservation costs for government-owned buildings will put additional demands on government resources; no doubt, housing authorities are budgeting for such outlays. Also, it seems that some provision for assisting non-government groups (such as non-profit housing) will be necessary if the rents for these buildings are to remain affordable.